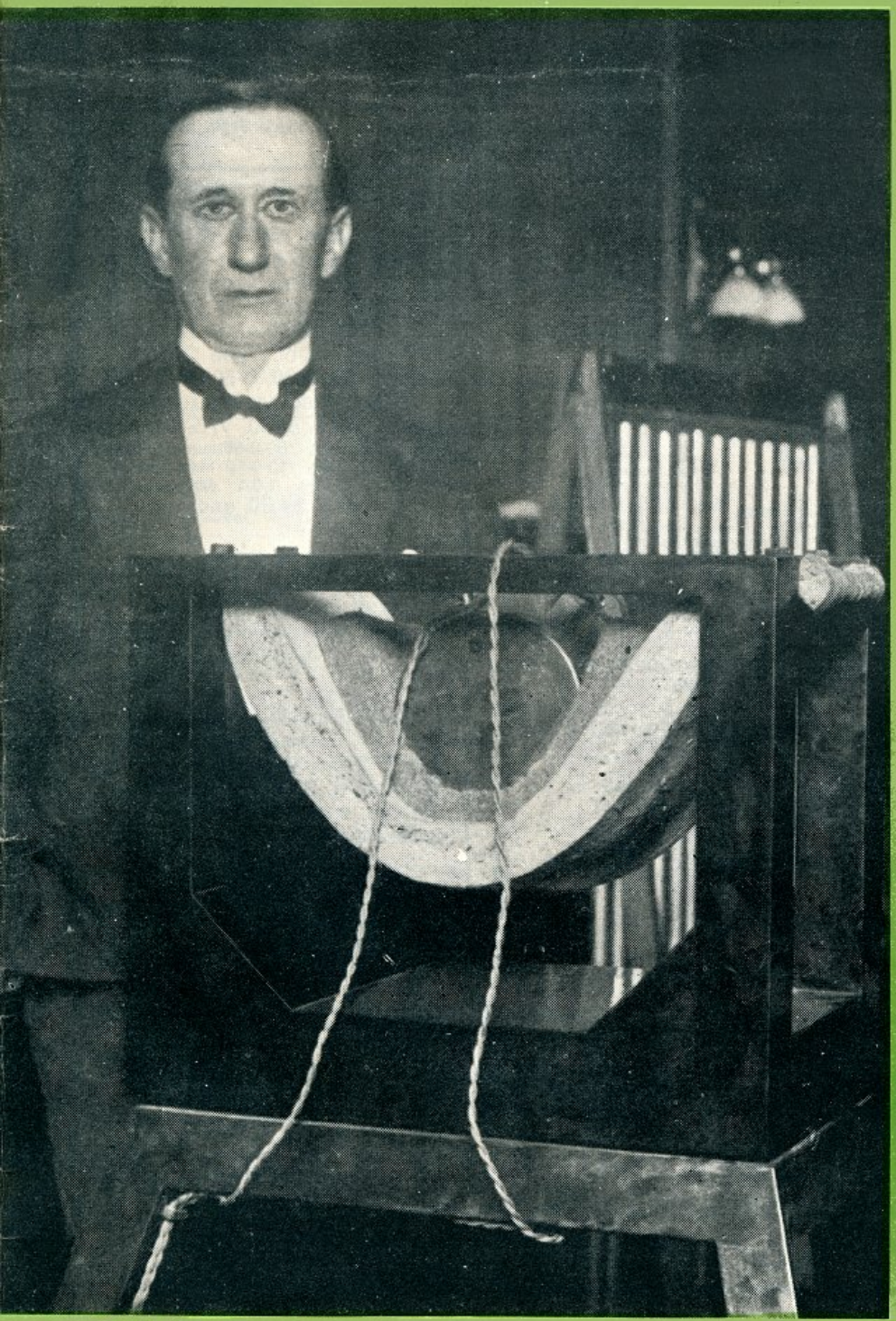
amateur radio

JULY 1974



- EARLY DEVELOPMENT OF THE MORSE KEY AND CODE
- IMPROVEMENTS TO THE FT200
- TRANSCEIVER RECIPROCITY AND RECEIVER COMPLEXITY
- REVIEW OF THE SPECTRONICS DD-1
- EXECUTIVE OFFICE — EDP — AR MAILING
- 1974 RD CONTEST RULES
- THE CW NET (CWN) — AN EXPLANATION

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER — Model TE-15

SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TR's & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

DELUXE AUDIO GENERATOR — Model HE-22D

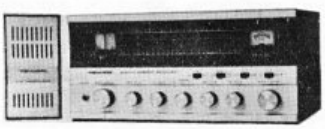
SPECIFICATION — Model TE-22D

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt.
Square 7 volt
Output Impedance: 1000 ohm
Freq. Accuracy +3% + 2Hz
Distortion: Les than 2%
Tube Complement: 6BM8
12 AT7, 6Z4
Power Source: 105-125, 220-240V AC, 50/60 cps. 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

Compact-Space Saving.
Printed Circuit for uniform Characteristics.
Low Distortion
Dimensions: 140 x 215 x 170mm
Weight: 2.8kg.

Price $49.50
P & P $2.00

DX150B REALISTIC with SEPARATE SPEAKER



The popular REALISTIC DX150B which has gone from strength to strength with amateurs, short-wave and broadcast listeners alike, now has a further improvement, A SEPARATE MATCHING SPEAKER included.
The DX150B gives long-range, world-wide realistic reception on 4 bands, including Broadcast Fully transistorised-all solid state-no warm-up delays, the DX150B will run on dry cells if current fails or is not available, will operate from a car's cigarette lighter or any 12V DC service. A 240V AC power supply is also built in. Over 30 semi-conductors-product detector for SSB/CW, plus fast and slow AVC-variable pitch BFO-illuminated electrical band-spread, fully calibrated for amateur bands-cascade RF stage-ANL for RF and AF-zener stabilised-OTL audio-illuminated "S" meter.

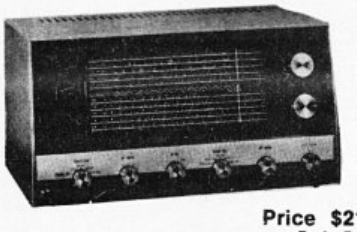
Price ~~$229.00~~
now price — **$189.00**
P & P $2.00

LAFAYETTE HA-600A SOLID STATE

GENERAL COVERAGE

5 BANDS 150-400 kHz, 550-1600 kHz (Broadcast band), 1.6-4.8 MHz, 4.8-14.6 MHz, 10.5-30 MHz.
Operates from 12 Volts DC (negative ground) or 220-240 Volts 50 Hz.

- Field Effect Transistors in RF Mixer and Oscillator Stages.
- Two Mechanical Filters for exceptional selectivity.
- Voltage Regulated with Zener Diodes.
- Product Detector for SSB/CW.
- Edge illuminated Slide Rule Dial with "S" Meter.
- Continuous Electrical Bandspread Calibrated 80-100M Amateur Bands.
- Variable BFO, Automatic Noise Limiter.
- Speaker Impedance: 4 to 16 ohms.



Price $215.00
P & P $2.00

Also available — HA800B Amateur Band. 6 Bands 3.5MHz to 29.7MHz and 50-54MHz as above features with 100kHz calibration **facility: $210.00. 100kHz** Xtal Extra **$10.75.**
P & P $2.00

SOLID STATE WIDEBAND RF SIGNAL GENERATOR

MODEL SG-402

This is an all solid state, wide-band RF Signal Generator which produces low impedance low distortion RF signals. It is highly dependable and easy to operate, and is a handy working instrument for service benches and electronic equipment production centres.

SPECIAL FEATURES

1. Generates wide range signals from 100kHz to 30MHz in six frequency ranges.
2. All solid state construction for instant waveforms, compact and lightweight portability.
3. Includes 400Hz signal source for modulation of output signal, which can be modulated by external sources.

Price $99.50. p & p $2.00

P.M.G. TYPE TELEPHONES—DIAL TYPE EXTENSION

Ericaion Type manufactured by L. M. Ericson. As used by PMG Dept. As new condition. Dial in base. **$19.50** Tested. p&p 75c
Black Phone. Chrome Dial Standard type. Robust construction. **$7.95.** Few only p&p 75c
Plastic Type. Standard PMK type. Manufactured by L. M. Ericson. As new tested. All phones fitted with standard phone plug and socket. **$17.50.** p & p 75c
Double Phone Plug, 6.5mm **75c**
Standard 2 Circuit Phone Plug PMG Type **30c**
PMG Type Counters, 4 digit, 48 Volt operation **50c**
PMG Type Telephone Plug & Socket, round type.
PMG Type Phone Plug & Socket, standard Ericson Type White Plastic **95c per pair**
PMG Type Telephone Extension Bells, 48V **$2.00**
230 Volt RVB Horn Tested **$7.50**

TRIO 3" OSCILLISCOPE DC — 1.5 MHz MODEL CO-1303A

SPECIAL FEATURES

1. Vertical sensitivity of 20 mV/cm, three step attenuation, AC DC operation & wideband frequency response from DC to 1.5MHz.
2. DC vertical and horizontal amplifiers for wide versatility make possible external sweep speeds of less than 1Hz.
3. All solid state construction for compact, lightweight portability.
4. Smoked filter glass CRT face and exclusive designed graticule, graduated in dB for clear waveform comparisons.
5. Direct input to 150MHz for SSB and AM transmission monitoring.

Price $150. p & p $2.00

JULY SPECIALS

NEW METERS

3 inch round 3-hole mounting
Moving Iron Type S065
0-15, 0-30, 0-50 VAC
0-10, 0-30 AMP AC
Moving Coil Type C065
0-10, 0-20, 0-30, 0-50 AMP AC
Direct Reading Type C065
0-15, 0-30 VAC

3 in. Square 50-0-50 wA uncalib.
2¼ in. Square 10-0-10 MA uncalib.
2¼ in. Square 1-0-1 MA uncalib.

ALL $4.50 each

AN/URM-32A DIVCO Wayne Frequency Meter
125 kHz to 1000 MHz
240 VAC Operation VGC
$130.00

B47 Plessey (England) Transceivers
Freq. 38-56 MHz FM. 24 VDC. Complete with microphone, cables, etc. Suit 6 metre operation. **From $35.00 each**

HAM RADIO
(Disposal Branch)

104 Highett Street, Richmond, Vic., 3121

HAM RADIO SUPPLIERS

323 ELIZABETH STREET, MELBOURNE, VIC., 3000

Phones: 67-7329, 67-4286 All Mail to be addressed to above address

Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 10.30 a.m. to 5.0 p.m., and on Saturdays to midday.

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

JULY 1974
VOL. 42, No. 7

Price, 50 cents

Registered at the G.P.O. Melbourne for transmission by Post as a Periodical—Category "B"

CONTENTS

FRONT COVER

Senatore G. Marconi, G.C.V.O., LL.D., D.Sc.
At the microphone of the London Station of the British Broadcasting Company (early 1920s).

Enquiries and material to:
The Editor,
P.O. Box 2611W, Melbourne, 3001.

Copy is required by the **third of each month.** Acknowledgment may not be made unless specially requested. All important items should be sent by certified mail. The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

Advertising:
Advertising material should be sent direct to **P.O. Box 150, Toorak, Vic., 3142,** by the **25th of the second month preceding publication. Phone: 24-8652.**

Hamads should be sent direct to **P.O. Box 150, Toorak, Vic., 3142,** by the **3rd of the month preceding publication.**

Printers:
Chas E. Tully Pty. Ltd.
35 Clifford Street, Huntingdale, 3166.
Phone: 543 1242.

Published monthly as the official journal by the Wireless Institute of Australia.

Reg. Office:

P.O. Box 150, Toorak, Vic., 3142

DIVISIONAL BROADCASTS

Do you have the time and want to keep in touch with events? If so here are the latest details available of Divisional broadcasts.

VK1WI
First broadcast scheduled for Sunday 21st April and thereafter same day and time:
10.00Z 3595 kHz
7146 kHz
146.5 MHz FM
BC Committee VK1VP, IMP, 2YS/1.

VK2AWI
11.00 local time Sundays:
3595 kHz AM
7146 kHz SSB
52.525 MHz FM
53.866 MHz AM
145.13 MHz AM
Hunter Branch Mondays 19.00h 80m.

VK3WI
10.30 local time Sundays:
1825 kHz AM
3600 kHz SSB
7146 kHz SSB
Ch1 FM
(subject to availability at present of relay stations whilst under re-location).

VK4WI
09.00 local time Sundays:
3580 kHz AM
7146 kHz SSB
14342 kHz SSB
re-broadcast on Ch B FM. BC officer VK4HB.

VK5WI
23.30Z Sunday mornings originating on 1.8 MHz band and relays as follows—
3.615 MHz by VK5ZQ
7.125 MHz by VK5NB
14.170 MHz by VK5TY
52.2 MHz by VK5ZEG
Ch 48 by VK5WB
VK8CM in Darwin on 2m
VK5DK in Mt. Gambier on 2m

VK6WI
09.30 local time on Sundays:
3600 kHz SSB
7080 kHz SSB
14100 kHz SSB
52.656 MHz FM
Ch1 FM

VK7
09.30 local time on Sundays originated on Mt. Barrow 2m repeater VK7RAA and re-broadcast in Launceston area 3672 kHz SSB, 7130 kHz AM and in Hobart area on 53.032 AM, 144.1 MHz AM, 146 MHz FM and 432.1 MHz AM.

SIDEBAND ELECTRONICS ENGINEERING

YAESU MUSEN TRANSCEIVERS
All in short supply, 50% deposit with orders, average delay in delivery 6 to 8 weeks.

FT 101 B AC/DC 160 to 10 M and fan	**$525**
FT DX 401 AC supply built-in	**$495**
FT/FP 200 combination	**$375**
YC 355 D frequency counter,	**$250**
Spectronics DD-1 counter for 101 & 401	**$175**
FT DX 400/560 noise blankers,	**$20**
FT 101/101B/560 CW filters	**$30**

BARLOW-WADLEY RECEIVERS
Model XCR-30 KHz to 31 MHz continuous coverage, crystal controlled **$225**

HY-GAIN ANTENNAS

14 AVQ 10-40 M vertical 19' tall	**$45**
18 AVT/WB 10-80 M vertical 23' tall	**$70**
TH3JR 10-15-20 M junior 3 el. Yagi	**$100**
TH3Mk3 10-15-20 M senior 3 el. Yagi	**$145**
TH6DXX 10-15-20 master 6 el. Yagi	**$175**
204BA 20 M monoband 4 el. full size Yagi	**$150**
DB 10-15 10-15 M el. Yagi	**$110**
Magnetic base mobile whip 108 MHz up with 18' RG-58U cable and coax plug	**$18**

ANTENNA ROTATORS

CDR AR 22-R	**$45**
Ham-M	**$135**
HY-GAIN model 400 roto-brake,	**$190**

All with control/indicator units

New surplus 8 core control cable, $0.25 per yard.

NOISE BRIDGES
Omega TE 01 up to 100MHz **$25**

EGG INSULATORS the old style porcelain eggs, a dozen for **$1.50**

POWER OUTPUT METERS

Galaxy RF-550A with 6 position coax switch	**$75**
Swan WM-1500 4 metering ranges 5 to 1500 W	**$50**

144-148MHz Two Metre Equipment

KEN PRODUCTS KP-202 hand-held 2 W output transceiver, now with 4 Australian channels, 40, 50, 42 & 48 **$150**

KCP-2 NICAD battery chargers & 10 NICAD batteries **$35**

Genuine leather carrying case for KP-202 **$5**

KLM ELECTRONICS solid state 12V DC amplifier, 12W output, ideal for the KEN KP-202 with automatic antenna change-over **$50**

BELCOM Liner 2 20W SSB PEP 12V DC solid state transceivers **$250**

CLEGG FM 27-B 25 Watt output 145-147MHz transceivers, independant continuous receiver and transmitter tuning, with by-law import duties exemption only **$350**

YAGI ANTENNAS 9 element 10 ft. boom, with gamma match coax feed **$30**

POWER SUPPLIES, 240V AC to 12V DC 3 to 3.5 Amps. regulated **$30**

ELECTRONIC KEYERS Katsumi model EK 105 A 230V AC with key paddle **$35**

CRYSTAL FILTERS 9 MHz similar to the FT 200 ones, with carrier crystals **$30**

27 MHz NOVICE LICENCEE & CITIZEN-BAND EQUIPMENT

MIDLAND 5 Watt AM 23 channels, all crystals with PTT microphone **$95**

PONY 5 Watt AM identical to the Midland, model CB-78 **$95**

CB-74 5 Watt AM with 27.880 crystals for fishermen **$80**

SIDEBAND NC-310 one Watt hand-held 3-channel transceivers **$50**

SIDEBAND NC-501 SSB /AM 23 channel 15W PEP transceivers, soon here **$175**

MIDLANDS PRODUCTS SWR-Meters **$12** & **$16**
PTT dynamic microphone **$10**

LOW PASS TVI FILTERS, cut-off frequency 35 MHz 6 sections filter **$18**

All prices quoted are net, cash with orders, sales tax included in all cases, subject to changes without prior notice. No terms nor credit nor COD, only cash and carry, Government & Public Company orders included. Include 50 cents per $100 value for all-risk insurance, freight, postage and carriage are all extras. MARY & ARIE BLES, Proprietors.

NOTE—I have just returned from a four weeks around-the-world shopping trip, looking for improved supplies of current and new equipment. In Japan YAESU MUSEN sets are still in short supply, there was not a single FT220 2 Metre AM/SSB/FM transceiver anywhere yet, neither an FT101-R receiver. In my opinion, they should concentrate on more production of the popular models instead of continually adding more types.

HY-GAIN's manager and co-owner, Ted Andross in LINCOLN Nebr. wants me to branch out to other Hy-Gain products, commercial, professional and C.B. antennas in addition to the amateur ones with promise of extra wholesale discounts. Such will be necessary to compensate somewhat for the 25% price increase in two steps since February 1974, a TH6DXX now costs US$225 retail overseas, or $150 of our money. I shall sell my present stock at the existing prices but new imports will become dearer.

LONDON KW ELECTRONICS still cannot supply much, Rowley Shears has to concentrate now more on commercial and less amateur KW 2000E productions.

BARLOW, DURBAN, SOUTH AFRICA. Their plant is now getting better organised for increased production of the XCR-30 WADLEY loop receivers and they will consider a set in a more professional communications receiver jacket, covering all the way down to 15 kHz. I had the extreme pleasure and privilege of meeting Dr. Wadley, the original designer of the receiver's principle, who is with the Barlow Concern there in an advisory capacity.

SIDEBAND ELECTRONICS ENGINEERING

P.O. BOX 23, SPRINGWOOD, N.S.W. Post Code 2777

TELEPHONE (STD 047) 51-1394

PRICE ERROR: Hi Mound Model BK-100 Semi Automatic Bug Key in our May Advertisement. Price should be **$28.50.**

YAESU MUSEN

Owing to shipping difficulties over the past few months we have been unable to supply all your orders ex stock. There is a large shipment of equipment on the water and it is expected to arrive in Melbourne by early August. To help fill outstanding orders promptly we have arranged a special Air freight shipment. This should be in our warehouse by mid July.

At the time of writing there are a few FT101B and FT2B available from this shipment (so get your orders in quickly).

All customers with units on order will be contacted when the equipment arrives and has been checked, and passed our workshop acceptance tests.

Don't forget Yaesu Musen from **B E S** means that every unit is pre-sales checked and passes our acceptance test, also you get 90 day warranty and continuing After Sales Service.

K. W. COMMUNICATIONS LTD.

A DIVISION OF DECCA LTD., U.K.

Our current shipment of equipment from K. W. Communications is due early this month. It includes stocks of the following:—

KW E-ZEE Match Ant. Coupler
KW-107 Super Match Coupler
KW-109 High Power Supermatch
KW-160 160m Ant. Coupler
KW-Multiband Ant. Traps
KW-108 Monitorscopes
KW-2000E Transceiver
KW-103 SWR/Power Meter
KW Dummy Loads
KW Antenna Switch
KW Balun
KW Multiband Dipole

Those who have any of the above types on order and if not already advised, please contact us as soon as possible.

Australian Agent:

BAIL ELECTRONIC SERVICES

60 Shannon St., Box Hill North,
Vic., 3129. Ph. 89-2213

HEATHKIT

MONITOR SCOPE
MODEL SB-610

- **Provides accurate Display or Transmitted AM CW RTTY Signals.**
- **Shows signal envelope, A.F. and R.F.**
- **Shows receiver I.F. envelope with IF's up to 6MHz.**
- **Operates 160-6 Metres. 15W - 1kW.**
- **Trapazoid patterns.**

$105.88 incl. Sales Tax **Ex Stock**

Build this kit and write for your free mid-1974 Heathkit Catalogue, which includes
DIGITAL CLOCKS — SWR METERS — TRANSCEIVERS, etc.

SCHLUMBERGER INSTRUMENTATION AUSTRALIA (PTY.) LTD.
112 High Street, Kew, Vic., 3101. P.O. Box 138. Tel.: 86 9535
and
Suite 7, P. & M. Bldg., 134 Willoughby Road, Crows Nest, N.S.W., 2065 Tel.: 439 7650.

AUTHORISED DISTRIBUTORS

Digitronics Australia Pty. Ltd.,
12 William Street, Maryville, N.S.W., 2293. Tel.: 69 2040

A. Oliver Electronics Pty. Ltd.,
188-192 Pacific Highway, St. Leonards, N.S.W., 2065.
Tel.: 43 5305

AGENTS—

S.A. **Associated Services** Pty. Ltd.,
110 Tynte Street, Nth. Adelaide, S.A.
Tel.: 267 2246

Q'ld. **L. E. Boughen & Co.,**
P.O. Box 136, Toowong, Q'ld., 4066
Tel.: 70 8097

W.A. **Dawson Instruments,**
70b Hale Road, Wembley Downs, W.A., 6019
Tel.: 41 4117

Please send my mid-'74 free Catalogue.

Name .....

Address .....

.....

Post Code .....

QSP

UNITED WE STAND

There seems to be a lot of talk about parts of States breaking away from their Divisions to form Divisions of their own.

The WIA is like a house. In the entrance hall lives the Executive to guard the front door, to keep it bright and sparkling for all passers-by to see and for visitors to use in passing in and out on daily business.

The house now contains seven main rooms. It used to have six; last Easter the owners of the house approved the construction of another room to accommodate a new Division. In each room lives one of the seven Divisions.

The owners of the house are actually a group consisting of seven people — one from each room.

Those who live in each room get together and appoint a Council of their own to look after their room.

If some of those who live in a room no longer like the room they could consider building another room onto the house. But they cannot do this without getting permission from the owners of the house.

The owners could easily refuse permision for many reasons. Perhaps a humpy tacked onto the house would detract from the appearance and value of the house. Perhaps the owners would be afraid that the occupants of the old room and the new extension would forever be at war with one another and thus upset the whole neighbourhood and those living in the other rooms of the house.

In days gone-by, some of the people in one of the rooms got the brilliant idea of trying to get a crane to lift up their room and deposit it somewhere else. But this failed because the house was very strong and their room mates, who were much wiser, could see that this was a very bad move.

Some of the people in one room conceived the idea of breaking down part of the outside wall of their room to build on another front door. Unfortunately the existing front door was the only one leading onto a pathway. Anyway, those who guarded the existing front door objected. So did the occupants of all the other rooms.

You can easily see that the owners of the house must have the facility to look after the house properly.

If any rooms need to be sub-divided or if someone wants to extend the property the owners *MUST ALWAYS* have the final say. The "owners", of course, are the Federal Council.

J. McL. Bennett
VK3ZA

NOVICES

"This year — 1974 — is sure to be a **BIG YEAR** for **YRCS** with new syllabuses and course and **NOVICE LICENCES!** Good luck with your efforts to join the first batch of Novice Operators **EVER** to appear in Australia." Rex Black, VK2YA, writing in Zero Beat, Feb. '74.

A SLOW BURN

The **ARRL** authorised an expenditure of $38,000 as a grant for the construction of another Oscar for the use of all hams. Now to hear a brother ham speak with pride of the **QSO** he had through an Oscar which was supported by the **ARRL**, and at the next breath to hear the same brag that he "never belonged to the ARRL and never will", to me is the height of ingratitude. Strays in QST Jan. '74. (For 'Oscar' read 'repeater'? — Ed.)

OSCAR 7

Amsat report Oscar 7 launch delayed because of problems on launch vehicle. Earliest launch now expected to be September/October.

REPEATERS

A tabulation in Issue 3 of QTC for 1974 (the Swedish Radio Amateur Magazine) shows 30 repeaters registered in Sweden of which 10 are QRT. These are allocated to eight channels beginning with 145.000 MHz upwards by 25 kHz steps for inputs with outputs 600 kHz separation from 145.600 MHz upwards.

REPEATERS AGAIN

In "Radio ZS", the official journal of the SARL, for Mar. '74 it is observed that 6 m repeaters in South Africa have been allocated frequencies 52.15 MHz input, 52.750 MHz output or 52.050 input/52.650 output. In the 2m band they have 19 repeaters in use or in preparation. The frequencies begin at 145.05 MHz input with 600 kHz separation for the output. Channel spacing has been 50 kHz but new allocations would have to be slotted in at 25 kHz spacings.

PIRATES PROSECUTED

RSGB Radio Communication regularly lists statistics about the successful prosecutions of persons using wireless transmitting apparatus contrary to the provisions of their Wireless Telegraphy Act. For example, in a recent four month period their Ministry of Posts obtained convictions in 10 cases involving 20 persons. Attempts have been made by the WIA to obtain regular statistics from the authorities here in Australia but there is either no central collecting and co-ordinating body or none can be obtained without recourse to every Court in the land. This latter is clearly a near impossible task but nevertheless amateurs would be interested in the figures if only they could be obtained.

NEW CALL SIGN

A8A to A8Z provisionally allocated to the Republic of Liberia. Rad. Comms., Mar. '74. DX-ers will of course have caught up with P2 (seemingly used mainly as P29) for Papua New Guinea.

ARRL — EARLY DAYS

In Feb. '74 QST we read that the Secretary on return "from an extensive 1923 field trip, primarily to the west coast, recognised a missing element. He found many members in some areas of the country feeling completely isolated from the course of ARRL affairs". Prior to that the ARRL had been governed by a board of 17 directors 'self-perpetuating' in the east with only 2 directors from west of the Mississippi. "While we were a small and rapidly growing organisation this probably was the best possible form of government for us. It was lacking, however, in that it did not take into account the idea of representation, and there were many large areas of the country which had no particular representation on the Board — every director was a director-at-large and merely one-seventeenth of the whole governing power".

STRAY FROM QST Feb. '74

Conditions on a CW 80m net were so poor that no stations were heard. "Even the few TV colour oscillators that were audible were coming in via skywave".

ARRL DXCC AWARD

The ARRL, in a letter of 1st May, advises IARU Societies that all applicants for their DXCC Award on and after 1st July 1974, must enclose U.S.$3.50, or the equivalent in IRCs, to cover the return postage costs of the applicants' confirmations by registered first class mail as well as the costs of mailing the DXCC Certificates and lapel pin. The ARRL has in the past 27 years requested but not insisted upon the payment of a sufficient amount to cover the cost of the return postage for applicants' confirmations but points out that the increases in postal costs have now reached the point where generosity must be tempered with practicality.

Be sure in future to send enough money (or IRCs) as shown above when you apply for the ARRL DXCC Award.

JA PREFIXES

Geo Francis, VK3ASV, sends details of call signs issued in the Tokyo area as JA1, JH1, JR1, JE1, JF1 and the latest JG1, Apparently it took 3 years to go through the JH1 series, 1½ years for JR1 and 1 year each for JE1 and JF1.

DXCC HONOUR ROLL

QST for March 1974 lists about 600 in the honour roll for DXCC ranging from 312 to 321 countries. In this list there are only two VKs, namely VK4QM with 315 in the general list and VK5MS with 316 in the radio telephone section. The lists reflect that only about 3 per cent are located in the Southern Hemisphere. Does this signify anything?

MELLISH REEF

In QST for March '74, page 96, there is a special announcement that contacts with both VK9JW and VK4FJ/Mellish Reef will be accepted for DXCC credit and submissions will be accepted starting 1st April 1974.

Transceiver reciprocity and receiver complexity

Reprint from Australian EEB, Augtober, 1972.

In reference to the article, "Direct Conversion Receivers" by K. L. Gillespie (**A.R.**, Feb. 1974) I would note that the author has perhaps presented an unduly rosy picture of the simplicity of the Double Conversion Receiver.

This subject has been examined in some detail in a series of articles in **The Australian EEB** throughout 1971 and 1972; your readers may wish to add this item to the list of Mr. Gillespie's references.

In those articles we discussed Direct- **vs.** Superhet-detection techniques, and showed that for the **same** performance and the same total circuit complexity, an equivalent amount of trouble will be encountered, no matter what (perfected) circuit is used. This is an absolute requirement of the laws of the Theory of Information, and it applies as truly to receivers as to antennas or love or anything else: you can't get something for nothing.

What we desire to get is, however, another matter, and it may well be worth simplification of a system if this appeals to our sense of fitness. For example, one may prefer to take the trouble to use and balance a good audio filter, compared to aligning a good **i.f.** system. Or one prefers the trouble of making a low-harmonic Local Oscillator and inserting a buffer, compared to the trouble of ganging tuned circuits. One often tends to regard as "simpler" that circuit which pleases one the most, and indeed to overlook its defects. There are, furthermore, many circumstances when the limitations of the simpler Direct Conversion systems are not too important, and then one appears to be getting something for nothing.

The multivalued nature of these matters is considered in the Augtober 1972 **EEB** in an article entitled, "Transceiver Reciprocity and Receiver Complexity", and which should be subtitled, "Is Direct Conversion Really Better?" I invite you to reprint it in **A.R.** for the information of your readers.

R. Leo Gunther, VK7RG, **Editor EEB**

A SQUARETABLE

Being a Discussion between Winston Henry VK7WH and Leo Gunther VK7RG with asides from Richard Ferris VK7ZDF.

PHASING-EXCITERS

Winston: I'm building that neat improved version of the Tucker-Tin SSB phasing exciter which appeared in the August 1971 **Break-In**. The original, rather simpler version of this was reproduced some years ago in EEB (valves, 1968; transistors, 1969). I'll follow it by a transistor linear amplifier with perhaps some 15 W PEP output.

Leo: Why not use valves in the final? Simpler, less worry about nasty parasitics, transients, neutralisation, etc.?

W: No, I want this to be portable as necessary.

L: Carrying the battery in a Back Pack?

W: Well, I can use a reasonable dry battery, and simply not modulate so heavily.

L: Why not just put the exciter on the air?

W: It's only milliwatts.

L: All right, but say you take 2 W from your final, that's only two S-units better than 100 mW, for ten times the power drain.

W: Well — it's only peak power.

Richard: Peak power or not, it's still a stupid argument. Why not use only 10 mW? After all, it will **only** be 2 S-units down from 100 mW . . .

L: Arguments by themselves are never stupid! A couple of S-units may not be major, but double that might be significant.

I admit, however, that I am simplifying the picture. For a home-installation where power is no object, 100 W are 3 S-units **better** than 1 W, and valves do the job easier and cheaper than transistors. On the other hand there exist the QRPP enthusiasts who maintain that "power is no substitute for skill", and who delight in achieving 1000 or even a million miles per watt. It all depends what you wish to make out of amateur radio.

For Winston's portable system, however, performance must be balanced against weight and size. It takes rather more batteries to deliver 100 mA than 10 mA, and obviously a 1A load is not as portable as either.

Empirically, some 100 mW will give quite a lot of coverage if it feeds a reasonable antenna. If the antenna has to be carried on the back, that figure might go up to 2 W so that those two S-units are not **lost.** If, say, the average level of your signals received at the other end is about S6 (or say, "10db above S9" in modern language), you might be willing to reduce power 20-fold to bring it down to S4, but below that you would get into difficulties unless you were operating CW.

Thus it resolves down to the amount of batteries you are willing to carry/afford, to antenna efficiency, to the band used, and perhaps to your diligence with low power!

WITH DIRECT CONVERSION RECEIVER

L: What about the receiver?

W: I thought I might use a Direct Conversion receiver. It's simple, and I could use the same oscillator for BFO as I have in the exciter (with a bit of conversion).

WITH GOOD AUDIO SELECTIVITY

L: Ummm, perhaps. But of course you'll want to use an audio filter with a good bandpass shape factor. The Chebyschev response one in the 1971 ARRL requires only 4 88mH toroids.

W: Well, yes, all right.

AND PHASING-DETECTION

L: And then there's the problem of audio image — nasty if QRM is heavy within a few kHz of your signal.

W: Yes, but that can be phased out, can't it?

L: Just so. I'll show you the relevant books on the two-phase system, or "Signal Slicer" (**EEB,** 1969, p.100).

W: Very interesting: No reason why I couldn't use the same components for the receiver phasing detector, as for the transmitter phaser, is there?

L: That's right. In the transmitter, audio is stripped from a sideband by opposite-phasing, and transmitted as a signal. In the receiver the signal is detected and turned into audio stripped of a sideband. Just the same process.

Not only does this eliminate half the QRM in your bandpass, it also increases S/N ratio of a SSB signal by 3db. It also allows painless reception of DSB, and even AM by the exalted-carrier principle Receiving both sidebands of AM on a product detector is awkward because of the need for the LO to be in phase with the received carrier. That this can be done at all implies only that the Local Oscillator is being locked by **pulling** from the received signal.

PHASING FOR BOTH Tx AND Rx

W: It sounds like a good idea, and from these valve circuits you're showing me the "Signal Slicer" doesn't look too complicated. No reason at all why the same circuit can't be used from the exciter, run backwards.

L: Yes, but you can't really do that literally. The inputs and outputs would have to be switched around and that could be awkward. In addition, the requirements for linearity of the receiving product mixer would be rather more stringent than for the transmitting one because of the greater dynamic range needed.

This might suggest the use of a couple of Dual Gate MOSFETS for the mixers.

You could use the same LO and RF and AF phase shift networks as for the Tx, but you'd either have to switch to a different audio amp or switch input and output of the Tx one. I shouldn't advise the latter, because of the high AF gain needed. High AF gain can be attained easily enough nowadays with an IC.

W: All right, but those phase-shift networks are tricky, and it would be well worth switching them from Tx to Rx. And the same oscillator stability can be achieved on Rx as for Tx — and that is important.

L: Ah so, but remember that that oscillator should have a clean sine wave output, or you may be receiving 7Mc Peoples Radio on top of 80M signals (or 20M California KWs on 40M).

AND AN RF STAGE

W: Why not merely add another tuned circuit at the RF input?

L: It increases the complexity of ganging the tuning. And in addition it is really quite a lot more effective if you pop the FET between the tuned circuits. And you could improve results even further by using an RF Q-Mult. or controlled RF Stage regeneration (harder).

W: More RF selectivity would also help to reduce crossmodulation from adjacent strong signals, as long as RF gain is kept low.

L: True, but that RF stage will also introduce a little noise, and even more if regeneration or Q-multiplication is added.

R: Regeneration may increase noise, but it also increases signal: The SNR is not affected unless you operate very close to oscillation.

W: In any event, a good FET introduces low noise. And it allows good AGC control — otherwise how would you get AGC on a Direct Conversion receiver?

L: Audio AGC.

W: But that won't keep strong signals out of the mixer.

AND A LINEAR MIXER

L: Use a linear mixer, like a beam-deflection valve, 7360 or similar.

W: This setup can't use valves, so I'll have to use the best available semicon. mixer.

L: Then use Hot-carrier Diodes, though they have the disadvantage that they require balancing transformers for a doubly-balanced configuration, if you're to get the lowest amount of harmonics and feed-through.

W: The DG MOSFETs might be simpler, and if RF gain is kept very low as Dick suggests, the mixer should be able to take the normal range of signals on the bands.

AND A BUFFER

L: A further refinement could be to add a buffer stage between oscillator and mixers.

W: Why?

L: To reduce the effect of "pulling" on the LO by incoming carriers.

W: But the only signals will be sidebands, no carriers.

L: No, a sideband is just a carrier whose frequency and amplitude are varying at a certain rate. You can have pulling of a LO by a strong adjacent-signal sideband, with the consequence that the LO frequency is modulated by the audio of the QRM. You can imagine what this does to the desired signal!

R: That's what I said.

L: Yes, certainly, where do you think I get all these bright ideas?

W: Perhaps the buffer might be useful, we'll think about it. Simpler first to try it without the buffer and see what happens After all isolation ought to be pretty good between the gates of a Dual Gate MOSFET.

AND A GOOD AUDIO

L: Perhaps. Try it and see — and let us know the results. I might add only that you will need to be very cautious about avoiding internal transistor noise and external audio pickup, because of the very high AF gain needed. You can take care of the circuitry by using an IC for the audio amplifier, but G3VA (in "Technical Topics") has suggested that superior results might be achieved by using discrete amplifier stages having bandpass filtering on each stage. This can also do wonders for the shape factor of the audio response, if intelligently designed.

W: The result of all this should be a pretty good receiver.

SO WHAT HAPPENED TO THE SIMPLICITY?

L: Indeed, but what has happened to all that **simplicity** the Direct Conversion Receiver is supposed to have? For comparable performance you need comparable complexity. **Simple** D-C simply has the advantage that you get somewhat better performance for the same number of components than you would obtain, say, from a good Regenerative Detector (and on CW they could be comparable!).

W: But D-C would appear to have the advantage that the (audio) selectivity is placed very early in the receiver, right after the one and only detector.

In a Superhet the maximum selectivity is obtained only at the end of the IF strip, so allowing the possibility of IF overload within the RF passband. Pat Hawker has quite a lot to say about this in **Amateur Radio Techn.**

BACK TO THE SUPERHET?

L: All right, but it's not fair to compare the two circuits unless you do so under comparable conditions! In the D-C, the pre-selectivity gain is kept low, and high linear mixing is used. As Pat Hawker mentions, you get the same results when RF and IF gain is kept low in a superhet using similarly linear first mixer(s). See also the fine discussion on this subject by Peter Martin in early 1971 issues of Radio Communication ("Plagiarise and Hybridise").

W: In a superhet you have the problem of RF images (**and** 2nd harmonic images). If you use double (triple, even!) conversion to avoid images you invite a lot of "birdies" from the harmonics of all of those oscillators.

L: Modern technique is returning to single-conversion, with lots of selectivity (from mechanical or crystal lattice filters) at high IF, and right after the **first** mixer. This avoids both the images and the birdies, and also avoids IF overload. Additionally, up-conversion (converting to IF **higher** than the signal) (see **Am. Rad. Techn.** for interesting application via varactor diodes) renders oscillator harmonics harmless.

The picture is completed by low noise low gain RF stages, and mixers biased for good compromise between sensitivity and linearity (See **QST** for Jan. and Feb. 1972). Thus, superheterodynes having good performance are becoming simpler (and better), while good Direct Conversion is getting more complicated.

Murphy wins.

A Direct Conversion set is simply a superhet with zero IF. IF amplification is replaced by AF amplification. It is "better" only if it is easier to achieve high gain and low noise in AF stages than at IF.

It isn't.

BUT DIRECT CONVERSION IS STILL BETTER — SOMETIMES

W: You've presented a pretty convincing argument for the superheterodyne, but you've overlooked something: A simple D-C will give quite satisfactory performance, and we have seen this in Ron Brown's (VK7ZRO) neat little unit. A simple superhet will give terrible results because of RF images, though I'll admit that it is worthwhile to use good selectivity filters for either.

A simple D-C is not troubled by RF images (the LO freq same as signal freq), and for the sake of simplicity it would be worth a little trouble to build a LO with low second harmonic content.

L: I suppose so, say a push-pull oscillator, or an ordinary Vackar or Seiler with some degeneration; the latter are reported to have **amazing stability** as well. A typical good, low harmonic Seiler Osc appeared in the Jan. 1972 Ham **Radio.**

W: The main point is that I want only a **simple** set for my mobile operation, one which is compact and easily portable — and reasonably easy to build.

The D-C fits this requirement better than the superhet, and I'm willing to accept a few limitations on performance. On the other hand I see no reason why I shouldn't be able to use the phasing components of the Tx on the Rx, and for only a little extra complexity add the **two-phase** detector. It will slice the bandpass in half, and that's impressive. With that one refinement it is certainly going to perform as well as most superhets, and better than many.

L: But surely not better than a superhet **also** endowed with a **signal slicer?**

W: Perhaps not, but that addition makes the already complicated superhet even more involved. With the D-C without an RF Stage I can still get good results if I have a linear mixer. Superhets without

RF Stages are useless for serious work. And to get good results from RF Stages you have to go to a lot of trouble, as Blakeslee shows in the Feb. 1972 **QST.**

Under dire conditions of strong signal QRM I could still pop in a switched RF attenuator. One of the big advantages of the D-C system is this flexibility: the basic receiver is good, and complex ones are even better — with a wide choice of refinements. The superhet has to carry a lot of baggage merely to work.

R: It seems to me that Winston wins this argument on the basis of simplicity. A D-C **can** be more effective when simple, than a superhet for the sole reason that the IF of the former is zero, so if there is no serious QRM within the audio passband, there is no problem of images even without an RF stage.

If there is serious **audio image** the use of the Tx phasing network on the Rx will phase it out, as he suggests. This results in reasonably high performance for a **portable** mobile system.

L: Why should the question of portability be so relevant here? Surely a couple of small IF transformers hardly impose a crushing burden?

R: One of Winston's requirements was that it "be easy to build". If it gets too complicated that requirement is not filled — and better a simpler set that gets built than . . .

L: All right. You build into a system the degree of complexity consistent with your requirements for performance, and with your ambition. Life always involves **tradeoffs,** and the argument here is quite analogous to the one about power levels, at the beginning of this article. But let us be disabused of the notion that by use of some magic design we can get **something for nothing.**

W: A bird in the hand is worth two in the oscillator . . . ●

Improvements to the *FT200*

J. Brown, VK7BJ
12 Thirza Street, Newtown, Tas., 7008

The author suggests two modifications to the popular FT200. The first modification overcomes erratic indications on the panel meter which are apparently caused by grid current in the 6BZ6 RF and IF amplifiers. The second allows an increase in the time constant of the AGC system.

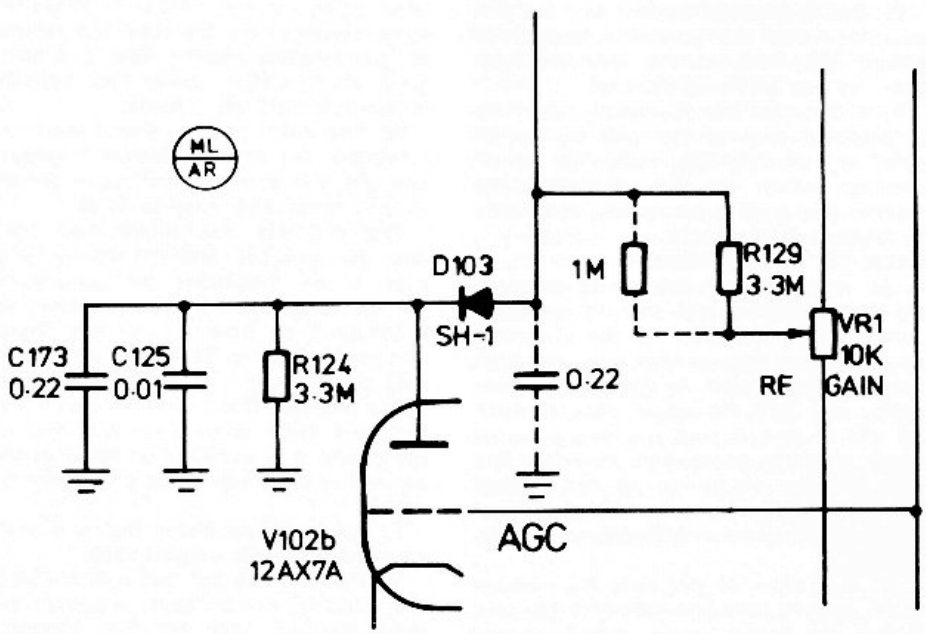
PANEL METER PROBLEMS

The author had experienced trouble with the metering circuit of his FT200, and as the final result was somewhat unusual, the story may be of some use to others.

The trouble began with the S meter zero wandering. This was fairly easily traced to either gas or grid emission in the 6BZ6 (V103 2nd IFA) causing current to flow through the 3.3M (R129) grid return, and so varying the bias. As both 6BZ6s in the set showed the same symptoms, the trouble was cured by fitting a 6BZ6 of Austrailan manufacture.

For some time after this, things proceeded normally until it was noticed that the PA resting current was dropping. The obvious suspect — the PA tubes and the bias supply-checked out OK. It was decided to let the fault "cook". However, when the current went negative, a full scale investigation was made. It turned out to be the 6BZ6 again. The metering return for the PA IC circuit goes to earth through the cathode resistor of this tube. It is supposed to cut off in the transmit position and so have no effect on the PA reading. However, the tube had intermittent leakage to grid, and this flowing through the 3.3M grid return (again!) allowed the valve to pass a variable current when it was supposed to be cut off. This allowed a reverse current to flow through the meter and so upset the PA readings. Another new 6BZ6 was called for to fix this.

However, it appeared that 6BZ6s were a lousy type and that further measures should be taken. The most obvious was to reduce the value of the 3.3M (R129) grid return as there seemed to be no reason for its high value. A 1M resistor was paralleled across it and this greatly reduced the process without any noticeable side effects on the operation of the receiver.



AGC MODIFICATION

Many suggestions have been published with the aim of slowing up the AGC fall time, and have been worthwhile modifications. However, in the author's opinion, the best way to do this is to connect a .22mf capacitor to earth from the junction of the anode of diode D103 and resistor R129. ●

an AR special

Executive office — EDP — AR mailing

By the time you read this the W.I.A. Executive office will have moved to a new QTH across the road from the old office.

The new address is Suite 2, 517 Toorak Road, Toorak. It is above and at the rear of the Commonwealth Bank in Toorak. The entrance is next to the banking hall and is on the north side of Toorak Road which is a clearway (no standing) from 16.30 to 18.30h on working days, so beware. There is usually ample short-period parking in the streets off, or parallel to, Toorak Road.

What does the Executive Office do?

As the name implies it carries out all the routine work ordered and required by the Executive. In addition it carries out the centralised processing of subscriptions and membership records on behalf of the Divisions.

The office houses the Secretary of the WIA. He is also the registered Public Officer of the WIA and is responsible to the Federal President. He is also answerable to the Editor for AR work and allied matters including Magpubs and other publications.

All the membership records as well as subscriptions are processed through WIA EDP programmes on behalf of Divisions. It is through EDP that your address label for AR is also prepared as an automatic function. The printing of subscription notices is another of the automatic functions and is carried out late in November or early in December each year.

With the exception of address changes and certain other changes of an essential but minor nature all the data for EDP comes from your Divisional officer responsible for the particular change. Thus, if you seek any grade alteration (such as a reduction of subscription because of becoming a pensioner), the EDP listings cannot be changed except by official advice from your Division.

Special EDP forms are in use to input the details of new members and to effect changes to the data already on file. The input to the computer is made once every month — on or near to the 15th day of each month. This is a convenient time for this to be done because firstly it is necessary to calculate the print quantity of the following month's AR and inform the printer. Secondly, a reasonable time must be allowed for the input to be punched, edited and then the address labels to be printed and delivered a day or two before AR is handed to the mailing service for packing and distribution.

As you will see, this is quite an integrated function in itself and does allow for a little flexibility in operation but which can easily disappear due to holidays and week-ends falling at awkward times. As long as any change, such as an address change, reaches the Executive Office before the mid-month shut-off date it will be in time for next month's AR. If the address change notification arrives even one day late it cannot become effective until AR of the month after the next AR.

An article in March QST about their change-over to computer labels last year said they have an average of 125 address changes a day. This is nearly twice as many as AR gets for a whole month and we have our problems even with our lesser quantity. Some addresses are too long for the number of spaces available — arriving at acceptable abbreviations for these causes quite a headache in itself. If the computer throws out any change because of perhaps a wrong member number or too long an address another month could easily be lost in sorting out the problem and putting in an amendment. This is quite possible when trying to resolve edit errors over the telephone.

Subscriptions processing causes more headaches than any other EDP area because of the multitude of different rates in force throughout the WIA. The accounting side of the EDP programme also is not a thing of beauty but has not so far been changed because of other more pressing alterations — such as getting membership records exact, change to computer address labels, etc.

There are seventeen different subscription rates in use. For new members two different systems apply. In one Division the applicant, on joining, is asked to pay only a pro-rata to take him up to the end of the year in which he joined. In the other Divisions he is asked to pay a full year's subscription. If the EDP papers suffer any delay in being sent forward the new member's first AR could be two or more months after the month in which he applied for membership so the pro-rata in the EDP file, which is based solely upon the month for which AR begins, will differ from a pre-calculated pro-rata. In these days of postal delays there could be quite a difference but in reality this matters very little because the EDP pro-rata will begin later and end later than anticipated.

AR address labels must also be printed out to comply with PMG requirements for bulk mailing under Category B. There are seven different distribution codes to cater for 4 different ordinary rate postages (internal and 3 for overseas destinations), 2 air mail rates and 1 for bulk parcels — i.e. more than 1 AR in an envelope.

The code is fully printed out on each address label, for example, "F 2 0 01." The "F" refers to the member's grade (see page 4 of January '74 AR), the "2" is the member's Division, the "00" is a pro-rata month indicator which is not yet in use for WIA members and the final digit "1" is the distribution code — 1 refers to ordinary mail deliveries within Australia. The member's call sign is not printed after the member's name because some members specifically do not want this to be done. The EDP programme does not cater for this either optionally or otherwise.

There is not a great deal of flexibility permitted for input data into any EDP programme. The parameters are laid down in advance. If you want any changes the programme itself has to be patched or altered. Every such alteration costs money so naturally this is only done when there is a really compelling reason for it to be done.

The great advantage to the WIA of an EDP system is the availability of a range of information in readily usable form. For example, the Executive Office keeps an exact full set of duplicates of every month's AR address labels. Membership lists, credit and debit lists and other varieties of print-out are kept up to date each month. Information retrieval in a convenient form is thus on hand so as to answer queries of many kinds.

Perhaps the non-receipt of AR by a member causes as much strife as anything. There could be several reasons for this and on receipt of a complaint each has to be carefully investigated. Was his label printed? If not, why not? Is the complainant financial? — late payers usually miss an AR or two; these cannot be replaced free of charge because of the small staff in the Executive office being fully extended on other day-to-day work. Is a financial member's address label suppressed because a previous month's AR had been returned to sender? — moral, notify your address change well in advance.

Basically, if it is reasonable to assume that a member does not receive AR through no fault of his own it is replaced free of charge but is mailed to him with next month's bulk mailings as an economy measure. The same applies if a member receives an AR with missing or blank pages. This does sometimes happen despite production controls all along the line.

The postage bill for AR each month is now well over $300 and sometimes nearer $400 on a higher weight category. This is almost one whole dollar per member per annum and yet there seems little likelihood of any improvement in the postal services. It still takes anything up to two weeks or more for AR to get to members interstate after the posting date. Perhaps in the not too distant future some other method of conveying information with precision and much cheaper will have to be invented. Will amateurs be in the forefront of such a development?

The CW net (CWN) — an explanation

FRANK MILLER, VK4II
95 Stanley Terrace, Taringa, 4068.

The Editor,
Dear Sir,
You perhaps recall the article on the CW Net which was published in AR, October 1973. Since that time the net has flourished and grown and looks likely to continue successfully into the future.

There are still many CW operators rather confused about what is going on on Sunday mornings on 40 metres. These chaps probably did not read that article but nevertheless have reason to be interested in the net. Unfortunately the net is being hampered in its operations to some extent by the need to take time off to explain how it works to passers by. Of course the necessary time is taken to explain things but it seems necessary to prepare some sort of written summary which can be sent out to answer the general questions. In collaboration with others the attached sheet has been developed. It should do the job.

Do you think it could be inserted somewhere in AR as general information?

CW is terribly important and must be preserved. The net is serving a very important role.

All the best, Frank Miller, VK4II

On Sunday mornings there is a net operating on the low frequency end of 40 metres* which has as its main purpose to arrange QSO's between stations which report in.

The net began over a year ago as an alternative to round table sessions which are often difficult to enter and leave, and which because of their sometimes clannish nature can seem forbidding to newcomers. Whereas in a round table of 10 a station has to wait 9 overs for his turn, in the CWN approach you can have as many QSO's as you wish, and on the average one would be in the transmit mode approaching half the time.

The CWN was formed early in 1973 and has been active ever since, with over 50 stations taking part at one time or another so far. On an average Sunday morning 15 stations report in.

The CWN is in no way exclusive. It makes no demands at all on members because it has no 'members' in the usual sense. It is an organised activity, however where operating procedure is concerned, and thus offers the added benefit of possibly improving the general standard of CW operating.

Being a net, it must have a net control station (NCS) whose job it is to record the station who calls in and to pair stations for QSO's. The NCS starts the net off (see QND), maintains order, and is always available on the same frequency to facilitate both reporting in and out. He remains on for the whole session and concludes it (see QNF). Following the end of each session those interested can take part in a 'post-mortem' discussion which takes place on 7040 kHz lower sideband, headed by the NCS. This affords the opportunity to discuss any problems which may have come up during the session.

To report in any Sunday, merely show up sometime between 0930 and 1130h EAST on 7025 kHz and listen for the station calling CQ CWN. Give him a short call and report in with QNI ('I report in'). Then wait until he calls you again with a station for a QSO. The NCS will check first that both stations hear each other before assigning you both a frequency to shift to. It is considered courteous to return after each QSO to let the NCS know whether you would like another one or would like to be excused from the net (see QNX)

In the course of the session each such day any station who thinks he would like a go at being NCS lets it be known to the NCS for that session. In this manner, there is no pressure on members to take a session yet those who would like to can do so. An efficient logging system has been evolved which makes the job of NCS almost child's play and this procedure is available to those interested.

Basic to the net is the use of QN signals. A list of these signals appears in both the US and Foreign editions of the Radio Amateur Callbook and also in the ARRL publication 'The Radio Amateur Operating Manual'.

To date, stations from all States except VK6 have reported in and there have been ZL's who tried to join in but the distance has beaten them. There have been as many as 18 stations in the net at one time and this has not been an undue burden for the NCS. It appears that a much larger number than this could be accommodated.

The CWN is not a high speed club Its motive is honest, to encourage new CW operating and to offer the opportunity to get the practice. Why not be in it?

*A group is currently forming on 80m on Sunday evenings. ●

WIA—A.A.R.T.G.

Interested in RTTY? Write for details to Secretary, Australian Amateur Radio Teleprinter Group, P.O. Box 16, Morley, W.A., 6062.

A.A.R.T.G. issue the quarterly magazine 'KEYBAUD' for RTTY enthusiasts

6 metre amateur band contacts between Japan and Australia

L. F. McNamara
Ionospheric Prediction Service Branch,
Department of Science

Some time ago VK amateurs were requested to forward details of contacts on 6 metres with JA stations to the Ionospheric Prediction Service Branch for analysis. The results of this work was described by the writer in a paper delivered at the recent IREE convention in Melbourne. A summary of this paper follows.

Radio circuits between Japan and northern Australia (and other similar circuits throughout the world) have been found to support propagation at frequencies well in excess of the conventional maximum usable frequency (MUF) and with signal strengths far greater than those normally obtained. This phenomenon has been called Transequatorial Propagation (TEP) and has been the subject of intensive investigations by both VHF radio amateurs and professional organizations for more than the last decade.

The predicted MUF on such circuits is based on a normal 2F mode and usually does not exceed about 40MHz. The TEP MUF, on the other hand, regularly exceeds 50 MHz and on some circuits regularly exceeds even 100 MHz.

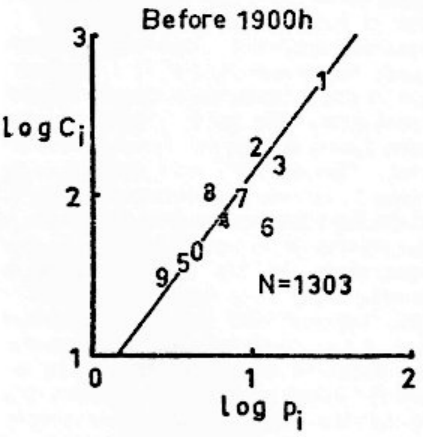


FIGURE 1:—Rockhampton data showing the numbers of contacts made with the different areas of Japan during the afternoon. The numbers denote the data points for the corresponding areas of Japan.

Information regarding the effect of circuit lengths of Japan-Australia circuits has been obtained by analysis of logbooks of Australian amateur radio operators and it is this aspect of TEP which will be considered here.

Japan is divided into 10 areas denoted by the call signs JA0, JA1, . . . JA9. These areas can be divided into three logical groups according to their latitudes. Area 6 is in southern Japan, areas 1, 2, 3, 4, 5 and 9 are in central Japan and areas 0, 7 and 8 are in northern Japan.

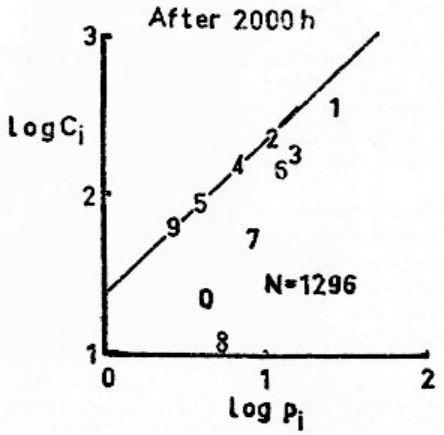


FIGURE 2:—Rockhampton data showing the numbers of contacts made with the different areas of Japan during the evening.

The information extracted from the logbooks of Australian amateurs was the callsign of the station contacted and the time of the QSO.

The data were found to be not amenable to rigorous analysis, although two limiting forms of a theoretical distribution were found to be quite useful.

In the limit of small numbers of contacts, it may be shown that the number of contacts C_i made in an observing period T is given by

$$C_i\,(T) \propto p_i^2 \qquad (1)$$

where p_i is the population of area i. This equation may be interpreted as arising from the facts that (a) the number of amateurs available in a given area is proportional to the population of that area and (b) the probability of selecting an amateur in one particular area of Japan when all areas are available is again proportional to the population of that area. The second limit occurs when all available amateurs in Japan have been contacted. Then

$$C_i\,(T) \propto p_i \qquad (2)$$

the number of contacts depending only on the availability of Japanese amateurs. The assumptions implicit in the derivation of these equations are that the areas are chosen at random and that in each area the number of amateurs is a constant fraction of the population of that area.

It follows from equations (1) and (2) that if log C_i is plotted against log p_i, the slope of the resulting best-fit straight line must lie between (1) and (2). Departures of a data point from the line for a particular Australian location provide information regarding the qualities of the circuits to the different areas of Japan. The position of a data point below the line, for example, can be safely inferred as indicating that the circuit to that area is poorer than to the other areas.

Figures 1 and 2 show the results of an analysis of data obtained at Rockhampton over several years (1957-1961).

There seem to be two types of TEP, with different characteristics. They are called, according to their time of occurrence, afternoon-type and evening-type TEP. The data have therefore been divided into two separated time periods in order to bring out any differences between the two types. Afternoon-type TEP is found to last until about 2000 LMT, with a major peak in occurrence rate at Rockhampton between 1900-2000 LMT. Evening-type TEP occurs after about 2000 LMT.

It can be seen from Figure 1 that during the afternoon, area 6 in southern Japan is significantly undercontacted on the basis of its population. During the evening (after 2000 LMT) areas 0, 7 and 8 were significantly undercontacted. This is illustrated in Figure 2.

Figures such as those shown have been prepared for 11 stations throughout Australia and have yielded a consistent picture of circuit length or latitude effects on Japan-Australia circuits. The conclusions reached are, however, limited by the nature of the data.

The general conclusions which can be drawn are:—

During the afternoons, the circuit to area 6 in southern Japan was the poorest.

During the evenings, the circuits to areas 7 and 8 in northern Japan, and to a lesser extent area 0, were the poorest.

The majority of contacts with areas 7 and 8 were made during the mid-afternoon.

ACKNOWLEDGEMENTS

This precis is published with the kind permission of the IREE*. A more detailed summary may be obtained from the Institution by purchasing a copy of the Convention Digest at $4 for members and $5 for non-members.

*Melbourne Division
Clunies Ross House,
191 Royal Parade,
Parkville
Telephone 347 2627

Early development of the Morse key and code (or *the growth of the idiot stick*)

Alan Shawsmith, VK4SS
35 Whynot St., West End, Qld., 4101

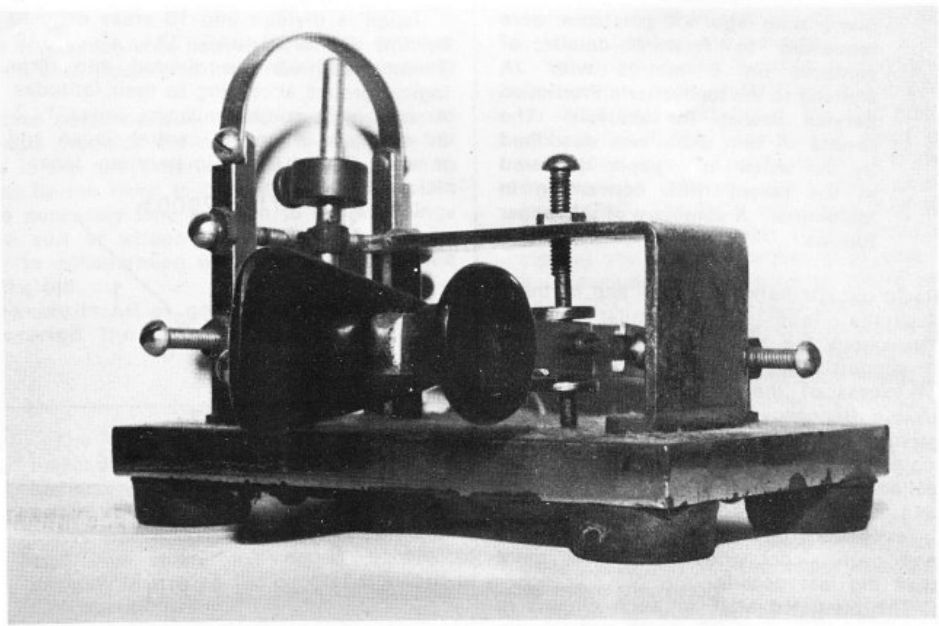
Next time you settle yourself at the rig, cast an eye at the key. Have you ever thought about the shape and design of the first such instruments, and the sound of the scene at the dawn of electrical communication?

The history of the morse key is short — approximately 140 years — but voluminous in detail. In this short period it dramatically changed the life style of every civillsed person on earth. No key development, no global village 1974.

The first sending instruments and the code, while not exactly planned and born as identical twins, did as one would expect, grow together from humble beginnings and assisted in each others development, like the brain/hand complex.

THE CODE

Samuel Morse came up with his brainchild in 1838. This was a system of dots, lines, dots and spaces that eventually became known as the American code (as distinct from the International code). However before this, there were several types of signals in operation. The Chapp Semaphore was working in Europe. The single and double Needle Telegraph systems were also in use. These were a code of deflection of an indicating needle or needles, to the L or R on a Dial Plate. The double Needle instrument was the more rapid. Speeds of up to 15wpm could be achieved by concentrating on the flying needles (what a headache). Eventually this was incorporated with the International code.



PENDAGRAPH with a difference. Unlike most, the paddles are at right angles to the key — after the design of the SIMPLEX.

The L needle indicating dots, and the R, dashes.

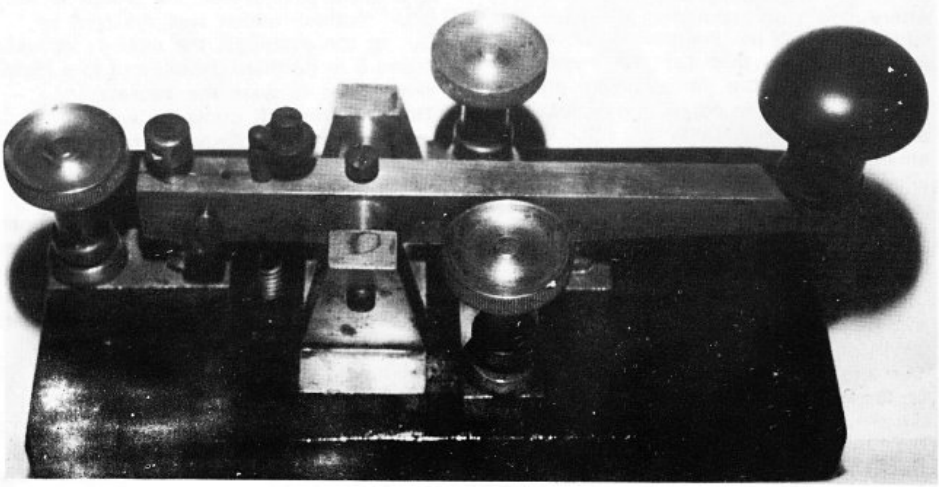
One other method functioning during this early period deserves a mention. It was the Steinheil. This used an instrument that inked or imprinted code on tape. After this came the **Direct Writer** (used in conjunction with Wheatstone systems) and the **Ink Writing Register.** This latter machine was hand wound like a large clock and ran for about 20 minutes. It might be described as the primitive forerunner of the modern teleprinter.

Generally speaking, visual code is more fatiguing to receive than sound. Committing it to paper becomes a task of divided concentration. The early visual Needle system, just mentioned, sometimes required a two or three man staff at each station. There was a reading clerk who read off the letters and words to a second party writing it on paper. A third, the Needle clerk did the sending (quite a business, eh).

The first recorded event of electrical pulses being converted into sound code, came about by means of the Needle instrument. Some bright spark (pardon the pun) noticed, maybe quite by accident, that the needle or needles, striking by chance a foreign object, made a different sound. So the Dial plate on the instrument was equipped with dissimilar ivory or ebony damper pegs. Thus the needle striking to the L or R made distinctive sounds, enabling the operator to write without any visual distraction.

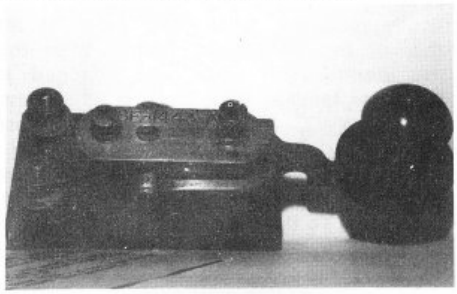
In Washington, D.C. USA on May 24th 1844, Samuel Morse tapped out his code over the first ever telegraph line. The operation was a success and a new language was born; one destined to be the means of saving countless lives, to direct

SINGLE CURRENT Telegraph key made by Silverton, London 1872. Note huge terminals 3½ cm tall. Polished brass on oakwood base. A beautiful key.



great military battles, to serve industry and commerce and assist in education all over the world right up until this present day.

Four years after Morse's achievement, sound reading of the code was accepted in the USA. It proved to be faster with less brain fatigue and economically superior from a commercial aspect.



NAVY/AIR FORCE key. Not this one, but this same model was used by Admiral Byrd on his first and famous trip to the SOUTH POLE. Antarctica, 1929. Fireproof, all moving parts encapsuled.

The distinction of the world's first Ham has been given to Guglielmo Marconi. In the 1890s, he and others began to demonstrate the feasibility of WIRE-LESS communication by radio tests in the 200-3000 kHz bands. These were first conducted at sea by the Italian navy. The distance achieved was about 22 km. Later this DX was increased to 300 km. Then, on that momentous and now historic day in December 1901 at St. Johns in Newfoundland, he managed, with the aid of a kite trailing a 400 ft antenna wire to receive pre-arranged signals sent from Poldhu, England, 3000 km away.

Continents had now been spanned and little or no imagination was needed to realise the potential of such an achievement in relation to trade, commerce or news. Like Neil Armstrong's first small step on the moon, Marconi's DX reception was the first step to making the world, electronically speaking, **a global village.**

Ship and shore stations now came quickly into use and a new breed of men was born — the **Wireless Operator.** These men put the new language — morse code — to the test of DX. The International code thus proved itself to be a completely accurate method of communication by radio frequency.

Time passes quickly in this fast changing world. The whining spark Txs are now museum pieces. So are the ponderous, long handled 'pumps' on which the OOTs have long since sent their last SK but the International code remains in use and is virtually unchanged.

It may surprise many to know that the world's merchant marine with its many associated services, including the military and navy, still depend to this day upon manual CW communications. The code together with the latter innovation, the 'Q' code and the economics involved still appear to be the best means of handling traffic under all conditions.

All Hams use the International code (even though some 'fists' appear to have a code all of their own). This is not the system of dots and dashes first put together by Samuel Morse — but a progression of it. His code, after some modification, eventually became termed the **American code.** It was introduced into Europe but was not accepted. After further alterations it was moulded in 1859 into the form we use today — the International code. The sequence of dots and dashes in relation to letters and figures etc., are markedly different from the American or telegraphers code.

THE KEY

It has been said in jest that the earliest and most basic device for sending electric signals was two rusty nails. This may not be so far from the truth. Probably the first sender was almost as elementary. The crudest form of STRAP KEY is certainly only one step better. Later refinements were H.D. terminals and a squared bridge over the strap at the knob end. This enabled a second circuit to be made.

Early devices or instruments for breaking current into impulses were known by various names in several countries. In the USA, the home of **keys,** Samuel Morse and Vail both experimented with devices for sending signals. No matter their form of construction, they were given the common name — **Correspondent.** Marconi, in later years also called his key by this name.

Vail in his experimental work published in 1845 refers to a **Lever Correspondent.** Explaining its function, he said, quote "— it opens and closes the circuit in the same manner as a **key** does a door."

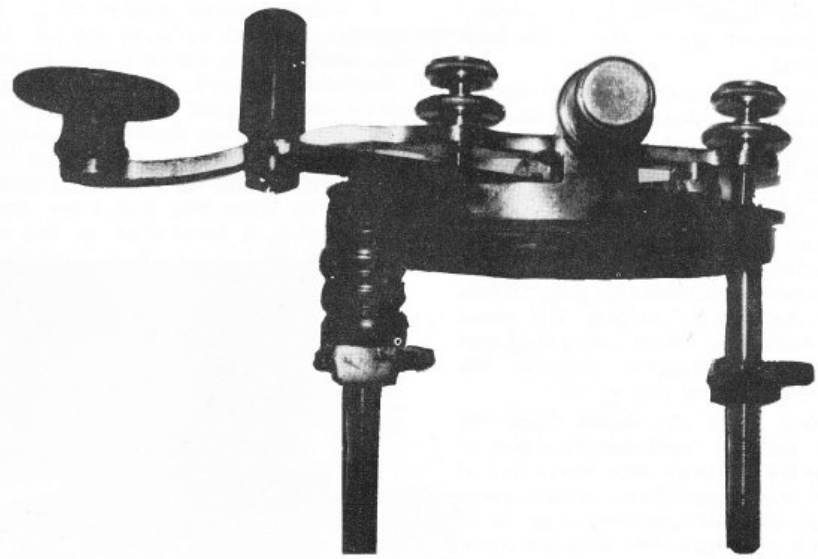
So the term **key** stuck and was universally accepted. Quite by accident Vail gave the instrument a name that's still with us 130 years later and now covers a wide range of 'pumps', 'bugs', electronic senders etc.

The odd shape of the vintage keys of the 1840-60 era would catch any eye. They incorporated the fulcrum movement and the sending arm was contoured similar to that of a camel's back. Some, in fact were known as the **Camel** or **Hunchback** key. The arm may have been shaped thus because it was felt it balanced the movement better — or maybe just to impress with a fancy design. Whatever the true reason, the form slowly changed over a period of twenty years or so to the more conventional straight or dropped arm we use today.

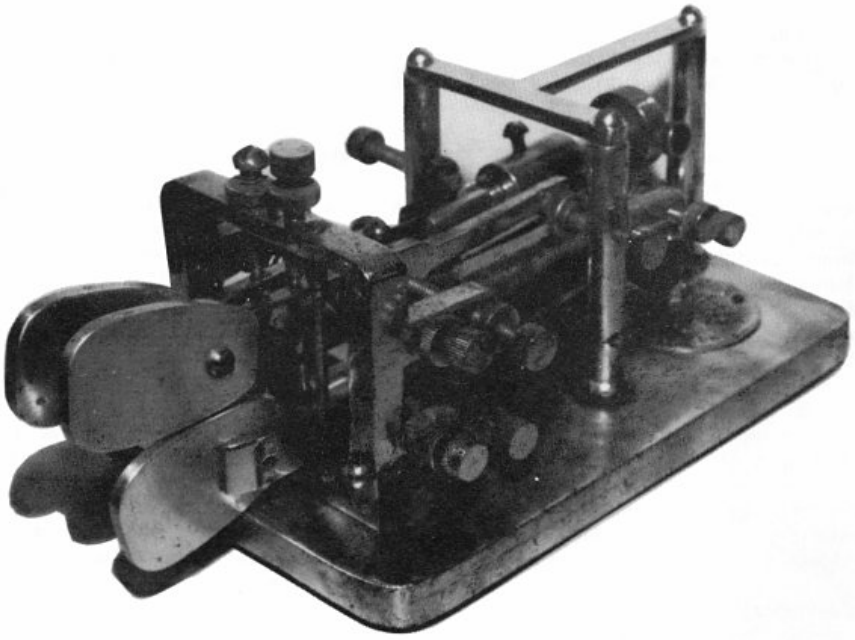
Design of the telegraph key developed along slightly different lines in USA and Europe. This was only to be expected. To attempt to state this difference in short and general terms, it could be said that the American trend was to a smaller and often metalbase oval key. The sending arm was downswept, slim and capped by a flat knob.

European keys tended to a rectangular wood, ebonite or other base, often an inch thick and heavier in general construction. The sending arm was straight and the knob round or tall. However no firm criteria applies.

In USA most early line keys were screwed to the table some 40-50 cm in from its edge. This meant the forearm could be rested and so assist long periods of sending with less physical fatigue. In VK and particularly in the PMG, the hand key was mounted right at the table edge where no forearm rest was possible. The



BUNNELL type 'LEG' Key about 1884, USA.



AUTOMORSE — or AUTODASH 'bug'. As name implies it makes automatic dashes as well as dots. Chrome parts on a polished aluminium base (no — you don't need two thumbs to work it).

correct operating position being to sit so that the arm, wrist and hand were parallel to the table top.

Up to the year 1900, exactly one hundred patents on morse keys were taken out in the USA and since the turn of the century to this present time, about the same number again. This total of two hundred does not include the many designs not patented and the wide range of keys built for the armed services. If we add to this all the keys of other nations the number is considerable indeed. Space would not permit a mention of even some of the better known types. However a comment must be made on one or two of the most famous brands.

The name J. H. Bunnel on an American key is the hallmark of quality, dependability and precision. This man was a telegraphist during the time of the civil war. Messages often ran to ten thousand words and more (no wonder the 'glass arm' became on occupational hazard). Bunnell realised the importance of a perfectly balanced key that could be operated for long periods with the minimum of fatigue. The result was the beautifully tooled, all metal, oval based, light but durable telegraph key perfectly balanced at any speed.

Practically every CW speed 'buff' has heard of, seen or used one or other of the **Vibroplex** series of auto keys. Top of the list is the super de-luxe model which has velvet smooth operation because of its jewelled movement. The smallest Vibrokeyer is a pocket sized edition suitable for portable use. Each key carries the bug insignia trade mark.

In past years in Australia, a considerable number of PMG keys found their way into Ham shacks. Those most commonly used were:

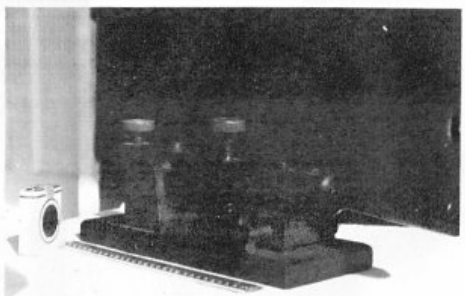
1. The **Learner** key. Straight bar, all HD brass, round bakelite knob and set on a 13 x 7.5 x 2.5 cm (approximately) wooden base.

2. Standard telegraph key used on single circuits. Design similar to 1. but has circuit breaker on LH side.

3. **Duplex** — as the name implies, used on duplex circuits. This key has a longer arm or shank than Nos. 1. or 2. The extra length is from the fulcrum to the knob.

4. Telegraph key similar to 2. Base approximately 10 x 7.5 by 2.5 cm, bakelite. Moving parts, chrome or white metal.

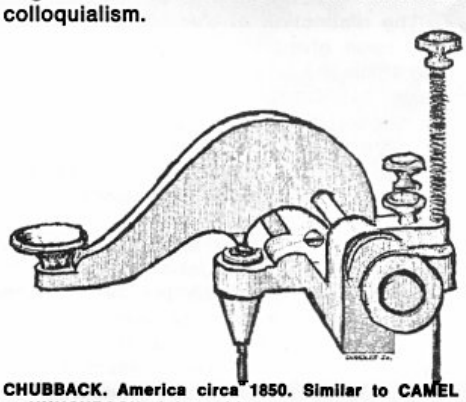
Automatics were the **Pendagraph** — also called a 'jigger' or vertical 'bug'. The arm and spring for making dots were set in an upright position. Others were **Vibroplex, Simplex** and the **Automorse** or **Autodash.** This latter **bug** had three paddles (see photo). It functioned as the name implies sending both dots and dashes automatically.



MASSIE W/T key 1908, USA. Is this the largest and heaviest key ever made? Compare its size to cigarette packet and foot rule. Approx. 32 cm long, 18 cm high. Weight 8 kg. In operation it broke 30 kW in air — no relays. To send — just pump the handle. Photo by courtesy W2ZI Museum.

AWA first supplied keys purchased from the Marconi Co. England in 1913. These senders were large and heavy and included a circuit breaker arm. During WW1, AWA began to manufacture its own. They were similar to the PMG design (probably No. 2 above). Until the mid-20s all AWA keys bore the **Expanse** trade mark. A vertically mounted rectangular plate at the rear of the instrument. Shortly after this the identification plate was changed to the more familiar AWA circular monogram. During WW2, AWA made several types of keys for the various armed services.

The Idiot Stick. Just another comic phrase in the esoteric language of **brass pounders.** To the lay person the movements of a key or bug make no sense at all — or does the term infer that only idiots pound brass? **Idiot stick fiddlers** might have been OK as a sub-title for the VK Key Club but unfortunately the phrase rather sticks on the tongue. It seems to have originated in the States — an American colloquialism.



CHUBBACK. America circa 1850. Similar to CAMEL or HUNCHBACK. A key with 'curvature of the spine'. Was its shape in keeping with the Victorian elegance of the period? (see text).

Some may think that progress to total communication will outdate the morse code. This seems unlikely. Radio and telegraph codes stand above and apart from all other forms of communication in one basic aspect. When conditions are really fringe and QRM, code will still get through when SSB and other forms fail. While the trained human ear is able to distinguish the difference of the dot and dash of a signal, no matter how weak or mutilated, then letter by letter and world by word the contact will be made. This is why in so many services today, the operator — from Ham to Astronaut — must still possess code proficiency. Morse can be transmitted in so many ways. By flashlight, car horn, flags, banging tin cans, tapping on any hard surface, arranging stones on the sand, etc. etc. Virtually anything that can be seen or heard will attract attention in an emergency.

Samuel Morse could not have seen the part his code would eventually play in world events. Someone writing in this magazine many years ago, rightly suggested that an obelisk be raised in his honour.

a review of the SPECTRONICS DD 1

The DD — 1 is a digital frequency display which is designed to operate in conjunction with Yaesu Transceiver models FT101, FTdx401 and FTdx560. It provides a six digit display of both transmitted and received frequencies even when the clarifier is in use.
The operating frequency is displayed on 6 IEE DA-1300 incandescent display tubes. Resolution is 1 kHz or 100 Hz and is selected by push-button.

The DD-1 could be used with my transceiver using a VFO tuning from 8700 kHz to 9200 kHz. Operation on the 160, 80, 40, 20, 15, 11 and 10 metre bands plus WWV is provided for. The unit is very easy to instal as it requires only one coaxial connection to the transceiver and a 240 volt outlet to plug into.

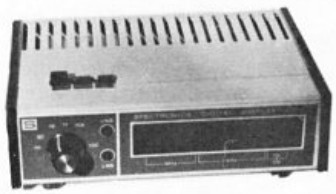
Initially the display was thought to be a little difficult to read; however after a few minutes' use this feeling disappeared and it was with some regret that the unit was unplugged and returned to the supplier. The most convenient placement for use was found to be on top of the transceiver.

To obtain best accuracy the manufacturer recommends that a sheet of cork or asbestos be placed under the DD-1 when used in this position, but this did not appear necessary after a 30 minute warm-up had been allowed.

The DD-1 is simple to use as once it is plugged in all that is necessary is to select the band on which you are operating, select the mode (USB/LSB), and the desired resolution (0.1/1 kHz). The mode selected is indicated by means of two LEDs on the front panel.

CALIBRATION

The DD-1 measures the VFO frequency and not the transmitted frequency. The means by which this is done are described under the heading of technical details. The manufacturer recommends tuning to zero beat WWV on 10 MHz and adjusting the DD-1 oscillator until the display reads 10 MHz exactly. This procedure was found to produce differences of 0.1 to 1.2 kHz between the actual transmitted frequency and the display read-out. These errors were constant for any one band but vary from band to band and arise because no allowance is made for the small offsets that occur in the various band heterodyne



Top view of the unit clearly showing the operating push buttons.

crystals in the transceiver. In the FT dx 401 at least no adjustment to the heterodyne crystals is possible. Therefore it is recommended that the following calibration procedure be used.

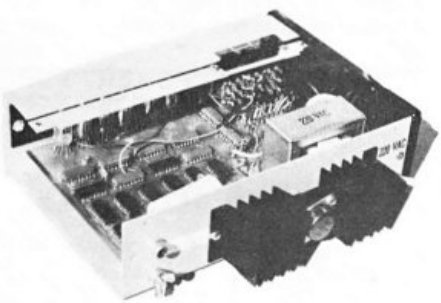
1. Remove the top screws at the rear of the case and slide the top cover back and out.
2. Apply power to the transceiver and DD-1. Allow both units to warm up for 30 minutes.
3. Tune in VNG on 7.500 MHz or WWV on 10.000 MHz on the transceiver and carefully set the 100 kHz calibrator to exact zero beat.
4. Set the band switches on the transceiver and the DD-1 to the band on which it is to be used. Press the mode switch to select the appropriate mode and select 100 Hz resolution.
5. Switch the calibrator to the 25 kHz position and tune the transceiver to a marker in the middle of the band e.g. 14.175 MHz.
6. Adjust the trimmer capacitor TC-1 in the DD-1 to obtain the correct display readout.

The maximum accuracy of ± 200 Hz can now be achieved on this band, and the errors on all other bands will probably not exceed 1 kHz. The procedure can be repeated on any other band if better accuracy is required.

TECHNICAL DETAILS

The DD-1 uses a bridge rectifier and an LM309k to provide a regulated 5V DC supply for the 22 IC's and the six readouts. A single 2N5133 transistor is used to amplify the incoming VFO signal before it passes to a DM747N flip-flop which is used as a gate. The gating pulses are of 0.01 second duration and occur about 17 times per second. These pulses are derived from a 10 MHz crystal oscillator which uses a DM7400 as the active device.

The 10 MHz signal is divided down by five DM7490 IC's to 100 Hz. As the transceiver VFO reverse tunes (e.g. 9.2 to 8.7 MHz for 3.5 to 4.0 MHz) the DD-1 has to count frequency "in reverse". This is achieved by connecting two DM7490 and two N8280A IC's as a four decade down counter. This divides the KHz and x100 Hz display tubes through four DM7447



Top view of the DD-1 with the case removed.

IC's. The remaining two digits display MHz and are achieved by the band select switch and some of the 67 diodes used in this part of the circuit. An additional 500 kHz is also added to the display when the 160, 80, 10B or 10D bands are selected. Also 3 kHz is added or subtracted from the display when the mode switch is operated.

SUMMARY

The DD-1 is a convenient easy-to-use digital display unit which complements many of the Yaesu transceivers. It will appeal to those who want to come up on the exact frequency for skeds and those who like to know their operating frequency with high accuracy. The display is free from flicker and sufficiently bright for use with high ambient lighting. Its construction is of high quality and indicated that the DD-1 would very rarely require servicing.

VK3AFW

a Regulated power supply

JOHN EDWARDS, VK4IE
Reprinted from QTC, July 1972

This article describes a power supply built to enable a VHF mobile transceiver to be operated from 240 volts AC without a car battery as filter. The author set out to build a regulated supply capable of supplying up to around 15 amp with output voltage variable from 10 to 15 volts DC. The article is not intended to describe a unit to be copied exactly, but more as a source of ideas. To this end some details of the design are discussed.

The circuit consists of a transformer, bridge rectifier, filter capacitor, series regulator, and control circuit.

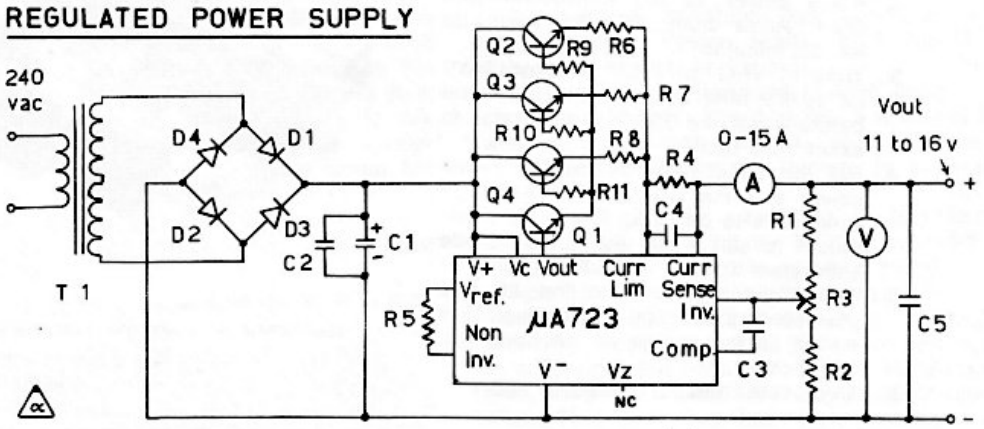
The bridge rectifier, depending on current ratings required, could be of the "Minibridge" type, or hard wired from automotive type stud diodes on individual heatsinks. The Minibridge is rated at 25 amps and costs about $7 to $8.

The control circuit is based on Fairchild's uA723 voltage regulator IC but similar units by other manufacturers could be used. The IC provides a current limiting facility which was set up to limit output current to 15 amps. The current limit terminals, as well as the input and output of the regulator, should be bypassed for RF. The uA723 is available for about $3. The data sheet on this device gives details on applications and also pin connections for the different package types available.

The series regulator consists of three transistors in parallel with the three bases driven in parallel by another medium power transistor. The driver transistor base is driven by the uA723 Volt pin. The 0.03 ohm resistors in each emitter and the 0.5 ohm in each base lead are to ensure equal current sharing in the power transistors. The power transistors used in the prototype were 2N3055 but any available transistor of suitable ratings could be used.

The transformer voltage and the filter capacitor required are inter-related and depend on the load voltage and current required. Normally a suitable transformer will be available and the value of C is unknown or vice-versa.

Consider the circuit shown in Fig 1. A transformer delivering a secondary voltage of Vrms is connected to a bridge rectifier. Now the output of the bridge rectifier, neglecting a small voltage drop across the diodes will be as in Fig 2 with a peak value of Vmax = 1.4 x Vrms.



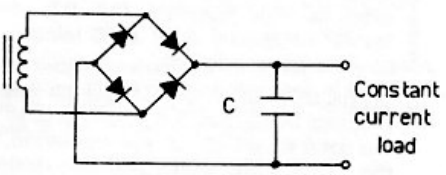


FIGURE 1

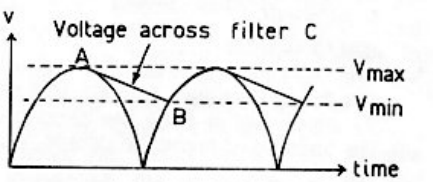
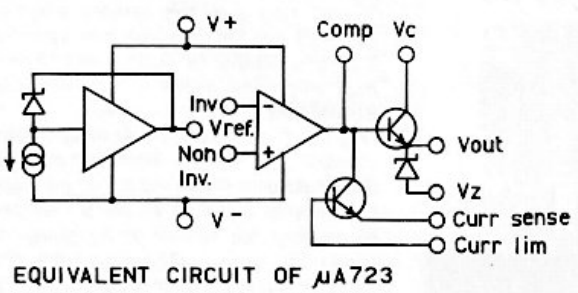
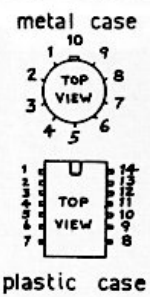


FIGURE 2



EQUIVALENT CIRCUIT OF µA723



µA723 PIN LAYOUTS

Pin No.	Metal Case	DIP Case
Curr Sense	1	3
Inv	2	4
Non Inv	3	5
V- (+ case)	5	7
Vout	6	10
Vc	7	11
V+	8	12
Comp	9	13
Curr Lim	10	2
Vz	—	9
Nc	—	1,8,14

Q1 Medium Power Transistor
Q2, 3, 4 2N3055
D1, 2, 3, 4 Bridge "Minlbridge PB40" or Auto Diodes
C1 14000 MF
C2 0.47 MF
C3 0.001 MF
C4, 5, 0.01 MF
T1 3 x 6.3 volts 8 amps
If used (Ammeter 0-20 A/FSD (voltmeter 15-20V FSD
R1 4.7K
R2 6.8K
R3 5K Pot.
R4 0.04 ohms
R5 3.3K
R6, 7, 8 0.03ohms
R9, 10, 11 0.5 ohms

For satisfactory regulation, the input to the regulator must be about +4.4 volts higher than the required output voltage. Therefore assuming +13.9 volts to be the maximum voltage required at the output, the minimum voltage which may appear across the filter capacitor is

Vmin = +13.8 + 4.4 = 18.2 volts

At the peak of the input waveform, point A, the filter capacitor is charged to Vmax volts and he charge stored, C = C x Vmax. The capacitor will discharge into the load, in this case the regulator and load, when the input AC voltage drops below its peak value.

At point B of Fig 2, the capacitor has discharged to a voltage whose value is equal to Vmin, at the same time that the next half cycle reaches the same value. The time AB in milliseconds is equal to

$$5 + 1/18 \quad \text{Sin}^{-1} \frac{V\ \text{min}}{V\ \text{max}} \quad \text{in degrees}$$

For practical values, this time AB is around 7 milliseconds.

During this 7 milliseconds or so, the load is discharging the capacitor at a constant rate of, say 1 amp. The charge lost by the filter capacitor in this time is equal to (1 amp x 7 milliseconds). The charge remaining in the capacitor at point B is equal to (CxVmin). Therefore the charge lost is equal to Cx (Vmax-Vmin) and also equal to (1x7). This gives a formula . . .

1 amp x 7 milliseconds

=C farad x (Vmax-Vmin) volts

= C farad x (1.4xVrms — Vmin).

Thus for a given value of Vmax or Vrms and a required value of 1, the value of C necessary can be calculated.

For example, given . . .

Vrms = 19 volts AC

Vout = 13.8 volts DC

1 = 15 amp

Vmax = 1.4xVrms = 1.4x19 = 27 volts

Vmin = 13.8 + 4.4 = 18.2 volts

Vmax — Vmin = 27 — 18.2 = 9 volts apx.

C = 1x7/(Vmax — Vmin)x1000

= 15 x 7/(9 x 1000) farad

= 12,000 microfarads approx.

If a fixed value of capacitor is available, the transformer voltage can be calculated from the above formula.

The range of output voltage variation can be adjusted by changing the values of the resistors in the x voltage divider across the output. For more details the uA723 data sheet is very helpful.

A note about heatsinks for the power transistors. Whilst having a power dissipation rating of 117 watts at 25°, C when mounted on a six inch length of Miniwatt 35D heatsink a single 2N3055 will safely dissipate only 60 watts approx, and the heatsink and transistor case when continuously dissipating this 60 watts will reach around 80° C above room temperature. This may sound alarming, but the transistor will not be damaged under these conditions. However, the human finger makes a painful thermometer when trying to measure this 80° so be careful.

The wiring method on the prototype was "rats nest" which is much easier than other methods, but not as neat. All wiring carrying heavy currents was done with automotive type wiring capable of handling the required current. All of the jointing in this heavy cable was done using a crimp tool and crimp type terminal lugs. These make for quick assembly and joints in heavy cable are easier to make than soldering.

The authors supply was built in a wooden box, or rather a box was built around the supply. The front panel is made of aluminium however, and contains all the controls and output terminals. The ammeter used was an 0 to 20 disposable type and the voltmeter was a similar type from the junkbox modified for 0 to 15 volt FSD.

The prototype has already proved very useful in tracking down a voltage sensitive fault in a mobile transceiver and has been used as a power source for aligning gear which has been modified in frequency. And of course it is the best regulated 15 amp battery charger I have seen for a long time and I sincerely hope that this article will generate some interest in the subject.

The Transformer used in the prototype, T1, was a disposable type transformer rated at 3 times 6.3 volts at 8 amp, but in practice it happily runs at 8 amps all day and runs up to 15 amps on transmit without overheating. Unfortunately demand far exceeded supply and these transformers are no longer available from the source quoted, but other transformers will, of course, be suitable.

I used the MJE340 for Q1 but the 2N3055 would probably be cheaper.

The prototype has now been in operation over 12 months. About half a dozen other units are now in operation around the town, one of them operating about eight hours a day for six months without troubles. ●

Oriental FM

George Francis, VK3ASV
31 Donald St., Morwell, 3840

FM IN JAPAN
REPEATERS ARE NOT PERMITTED IN JAPAN

The main calling channel is 144.48 MHz.

After the contact is established, the operator moves to another working channel, although some operators QSO on the main channel, and cause a lot of grief to everyone.

The Japanese 2 metre band extends from 144 to 146 MHz.

A1 and F1	144.00-145.48
A2, A3, SSB	144.10-145.48
F2, F3	144.32-145.48

JARL 2m beacon on 145.48

All modes 145.48 and above

All Japanese simplex FM channels are planned with a 40 kHz separation up to 145.44.

Australia	50 kHz channelling
USA	30 kHz "
Europe	25 kHz "

Some Clubs have so-called "private channels" between 145.48 and 146 MHz. These clubs have regularly scheduled Roll Calls; On Air Meetings; or "Gab Fests" on these channels. e.g. The Toyota Motor Club for instance meets on 145.62 MHz.

2m JAPANESE FM CHANNELS

CH	1	144.36 MHz	*
	2	144.40	*
	3	144.44	*
	4	144.48	NATIONAL Calling
	5	144.52	
	6	144.56	
	7	144.60	*
	8	144.64	
	9	144.68	
	10	144.72	*
	11	144.76	
	12	144.80	*
	13	144.84	
	14	144.88	
	15	144.92	
	16	144.96	
	17	145.00	*
	18	145.04	
	19	145.08	
	20	145.12	
	21	145.16	
	22	145.20	
	23	145.24	
	24	145.28	
	25	145.32	
	26	145.36	
	27	145.40	
	28	145.44	

F2 & F3 144.32 145.48 MHz

* Main Channels fitted.

JARL plan

FM IN HONG KONG

Japanese 2m FM simplex channels are used, mainly

Channel A 144.480 MHz
Channel B 144.600 "

Hong Kong has one repeater going.

144.480 MHz IN
145.640 MHz OUT

Note: "Ken" hand held 2m transceivers that are sold in Australia are fitted with 144,48 and 144.60 MHz crystals. ●

Newcomers Notebook

with Rodney Champness VK3UG
44 Rathmullen Rd., Boronia, Vic., 3155

TWO METRE FM REPEATERS — FACTS AND FALLACIES (Part 1)

Recently two amateurs were discussing the operation of their respective commercial rigs on the FM repeaters. One was heard to say the following:

My rig shows 0.6 on the scale when I transmit on both channel 1 and 4 but I cannot understand why on Channel 1 I get a reading of one on the meter scale but on Channel 4 I only get a reading of 0.3. There must be something wrong with these crystals for the new channels as the local agent has just tuned up the set.

This amateur was firmly convinced that both repeaters should give the same limiter current reading on the two repeaters even though they are about 10 miles (Channel 1) and 40 miles (Channel 4) away and also have a similar power differential. Apparently he believed that the repeater should in fact cause his receiver to show the same meter readings.

It is only logical to assume that signals from distant stations will be weaker than those much closer, when the terrain is similar and more so when the local station in this case Channel 1 is about 4 times the strength of Channel 4. The other amateur in the discussion endeavoured to point out these facts. I might point out, the amateur with the problem was not a newcomer having been licenced for many years. It is obvious that this amateur is and has been for many years an appliance operator who does not know what goes on inside his equipment. He has a certain prestigious brand of commercial gear on the HF bands.

I am not against people owning and operating commercial equipment — but I am quite critical when they obviously know nothing about the workings of it. As an interested newcomer you will learn how your equipment works and will gain a lot of valuable knowledge. It is so much more interesting, this hobby of amateur radio, when you understand your equipment.

Another common misconception often heard when two amateurs are giving each other frequency checks on the various channels: **You are off frequency a bit on channel B Joe, but you are okay through the repeater showing spot on the zero of the discriminator. You are a bit distorted on the repeater perhaps you've got the wick wound up too far.** The wick of course is the common slang for deviation or modulation. Joe's mate has fallen into another of the traps where repeaters are concerned, in that the output frequency of the repeater transmitter bears no direct relationship to the frequency of signal that the repeater receiver picks up. Joe's mate is actually comparing the repeater output frequency with the general receiver alignment and particularly the alignment of his FM discriminator. The discriminator can only tell whether a signal is higher or lower than the frequency that it is tuned to.

If Joe's mate really wants to check his friend's transmitting frequency he would need to use reverse crystals and virtually act like a non-repeating repeater. Normally you can get the frequencies of your crystals set reasonably well by adjusting the trimmer across or in series with each for the best sounding signal at the other end. Make sure that the frequency standard station does in fact have his crystals accurately adjusted or you may be in trouble as you shift from area to area, and you will be told by the various groups that you are off frequency. You can be fairly certain that the repeaters input and output frequencies are accurately set so just adjust your receiving and transmitting crystals until you get the best reports and don't worry unduly about the discriminator readings.

If you are told you are chopping either through a repeater or direct after adjusting the crystals for best performance, it could be that you are over-deviating. This over-deviating gives the signal a chopped up sound as the transmitter frequency excursions extend outside the selectivity limits of the receiver IF strip; hence no input to the IF and therefore the receiver cuts off. If this appears to be the trouble reduce your deviation until the reports indicate that you are quite readable. The normal deviation through repeaters is about $\pm$ 10 kHz.

Next month I hope to show you in block form how the average repeater operates.

If anyone wants duplicated information on things I can assist with, please enclose stamps — low denominations — or postal note to cover costs of postage, and duplicating at about 10 cents per sheet. ●

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

SOME ADDITIONS AND IMPROVEMENTS FOR THE KEN KP202

The little Ken KP202 has really caught the imagination of dozens of two metre operators. Don Paice VK3ADP has made some natty changes to his Ken which are worth following if you are lucky enough to own one of these fabulous sets. Over to Don.

A BNC ANTENNA CONNECTOR FOR THE KEN

The versatility of the Ken KP202 can be significantly increased by replacing the existing antenna connector with a single hole mounting BNC connector. This modification is easily done and in no way detracts from the appearance of the unit. A suggested method is as follows: Remove the back of the Ken case but leave the control panel in place. Remove the meter by the use of a small instrument type screw driver. Unsolder coax to antenna connector.

Unscrew nut on top of connector and withdraw from unit.

Insert BNC connector after smearing a small quantity of Araldite under the flange. Tighten nut with small pliers and lock in position with a **small** drop of araldite.

Solder coax to BNC connector with the outer braid going to the nut.

WARNING. That nice solid satin chromed top of the Ken is plastic and will melt if you apply too much heat.

Replace the meter — it might be necessary to remove a small portion of the meter mounting leg to clear the BNC socket nut.

Modify the whip by driving out the pin and removing screw locking assembly.

Replace pin through whip and end assembly.

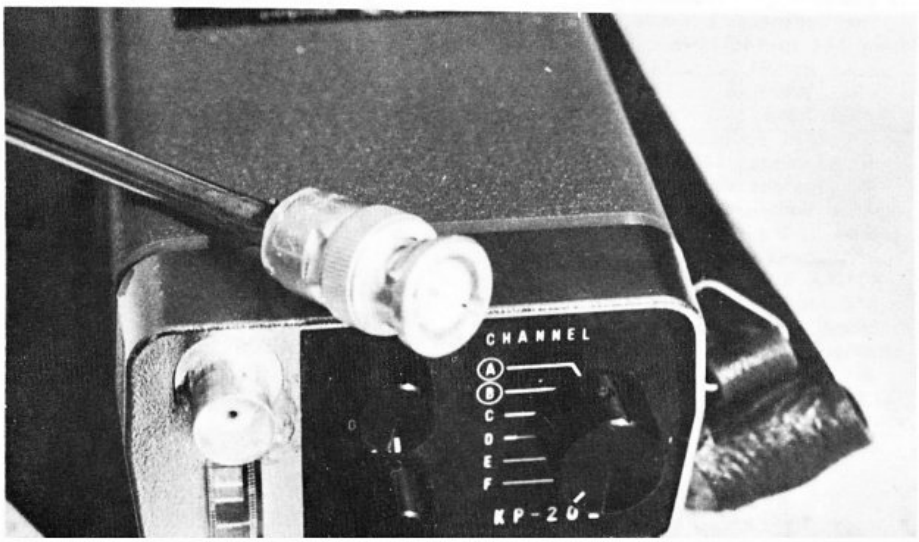
Drill out centre pin of BNC plug to size of conector pin on the end of the disassembled whip.

Insert and solder pin on the end of the whip to male pin of BNC plug. Assemble BNC connector and Araldite whip into connector.

Gentle application of heat from a soldering iron will ensure that the epoxy flows into the top of the connector.

Allow to set for 24 hours.

You now have a unit that can readily be used in your car with an external whip or portable with the telescopic whip. ●



Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

It seems that the supply of items from our readers for this column is beginning to "dry up". So for the next few issues each of the Technical Editors will discuss ideas or techniques which may be of current interest. Hopefully, by the time 3ABP and 3AFW have "dried up" there may be a few more contributions on hand to keep the ball rolling!

For this month, we would like to acknowledge a suggestion from Jim VK4CN for a frequency-multiplying vacuum tube. This came in late last year, but has been held over while we attempted to find if such a tube had been proposed before. It does appear novel and may be of practical value, but would have to be evaluated by a tube manufacturer.

Developing from the idea of the beam-deflection tube (e.g. type 7360, a popular balanced-modulator a few years ago) Jim suggests building a tube like an electrostatic CRT, but having a number **n** of anodes in ring formation rather than a phosphor screen. The anodes would all be electrically common and connected to an output tank circuit. Quadrature voltages on the deflection plates at frequency **f** would scan the beam around the anode ring, thus producing **nf** pulses of anode current per second in the output circuit (tuned to **nf**).

In concept the device somewhat resembles a magnetron, with its strapped anodes, but is intended purely for multiplication rather than oscillation. We would expect it to be of most use for ouput frequencies in the GHz range, but its efficiency might be low. We would welcome comments from anyone able to evaluate its capabilities either in theory or practice. ●

Technical Review

HI-MOUND MORSE CODE HAND KEY

This key combines pleasing appearance with robust construction. The metal work has a bright finish and moving parts are protected by a plastic cover.

The key is set on a block of white poly-marble which in turn has a rubberised base that compresses sufficiently to render the instrument rigidly self-mounting on the bench. This mounting makes the key stand somewhat higher than usual and thus is more suitable for the style of keying that involves flexing of the wrist and forearm rather than wrist only.

The knob has a platform for a comfortable finger placement. The pivots are mounted between two sets of ball bearings. Pressure on these is adjustable. There is a precisely adjustable back contact.

Under test, the return spring and pivot pressure were adjusted so that keying required only a pressure of 85 grams to make contact. At this adjustment, the release was smooth and immediate, making the key a delight to handle.

On the other hand, for the beginner or the heavy fisted, adjustment can be varied to give a wide range of tension and contact spacing.

The writer considers this key highly satisfactory. The price, though apparently high, compares favourably with that of hand keys produced for commercial and shipboard use.

Test key supplied by Bail Electronic Services.

VK3XB

VHF UHF

an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0RSG, Macquarie Island	52.160
	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4WI/2, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6VF, Perth	52.3015
	VK6RTU, Kalgoorlie	52.350
	VK6RTT, Carnarvon	52.900
	VK6RTW, Albany	144.500
	VK6VF, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
P29	P29GA, Lae, Niugini	52.150
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato x	145.150
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400
JA	JA1IGY, Tokyo	52.500

x — denotes change or addition

The only alteration to the list this month is the addition of ZL1VHW on 145.150 MHz. Incidentally, the New Zealand SSB calling frequencies are 52.2, 144.2, 432.2 and 1296.2 MHz. It would be well to bear in mind that similar conditions exist in New Zealand to Australia where the majority of VHF SSB stations are likely to be operating transceive, so net on his frequency if you are operating split tune equipment. Remember also, experience has shown that a good AM signal is received quite well on the average SSB transceiver providing your percentage of modulation is high, and the signal stable. If in doubt about the capabilities of your AM modulator, back of the loading and radiate less RF, and the audio will be much more effective. Reducing power output from 50 to 25 watts when only 20 to 25 watts of audio is available will make your signal readable much more readily and more often. For phone operation we don't listen to the carrier, we want the audio.

NET OPERATION

This is a touchy subject with some people, I fail to see why, but I guess we are made up of all kinds of people! However, a letter from John VK3ATQ raises a few interesting points, you might care to think about them. He mentions 53.032 is very popular in VK3, to the exent that two other mutually or generally agreeable frequencies are being used, the first and more popular being 53.100 MHz which corresponds to the VK5 AM net. The Mawson beacon VK0MA is also on this frequency. The other is 52.900, and occupied by VK6RTT, the beacon in Carnarvon.

John would like to make the point that net operation plays an important part in the usage of our bands, apart from the actual increased usage of particular frequencies. If they can be set up in all States similarly, they can act as a "sort of beacon", giving an indication of band openings to other areas, with more people listening, the more the chance of an opening being used. This was particularly true of the 2 metre openings in February, when the FM nets around 146 MHz certainly advised some operators of what was going on.

One regret of course is that so many operators graduate no further than the nets, and John agrees with this. Balanced thinking on this matter should produce a person with both net and tuneable equipment. The tendency to now go to SSB for serious VHF work is making openings available which were not workable before. Indeed, if you don't feel up to building your own SSB gear, "Amateur Radio" carries advertisements for 10 watt SSB transceivers at reasonable prices, complete with noise blankers and the works for 52 MHz, and before long 144 MHz. This sort of gear is suitable to run barefoot in Channel 0 territory and with this power plenty of contacts will result. It's no real problem to make up a linear using a QQE06/40 or similar (or solid state) and your signal will be very respectable on the VHF bands.

John mentions there are proponents for a net on 53.995 MHz, adding that tests indicate a 6 dB lower interference factor than at 53.032. Whether this will hold good for all TV sets is debatable and much of the internal circuitry of a car phone or similar would need to be made adjustable if operation is required at both ends of the 53 MHz range. Antenna compromises are also necessary, and anyone using a yagi cut for the low end of 52 MHz will find very little gain left at 53.995. Gain falls off quite rapidly on the high frequency side of the optimum frequency for which the antenna is designed, but will still have useful gain 1.5 MHz below the band.

The point has been made however, that John seeks to widen the interest and activity of net operators, particularly for AM on six metres, with a view to having more people around in different States using 6 metres, so observing DX openings, but with a plea that such increased operation should also be followed by an increase in capability to work on the tuneable sections of the band. What do you think?

SIX METRES

This ever popular band doesn't really ever go completely quiet, only the operators do! To give you some idea of what can be heard during other than the generally accepted "DX season", the following list comes from the log book of Roger VK2ZRH, kindly submitted by Roger Harrison, VK2ZTB. It makes interesting reading, and covers only a fortnight during the equinoxial period, 1st to 14th April, 1974. It's now a bit dated, but read on.

1/4, 0908 to 0930. E.S.T., 50.75, ZL TV S9; 2/4, 1100, 52. VK5ZEG. VK6 beacon S9+. 4/4, 1100 — 1135 VK5VF S8; 1122, 52.05, VK5MT; 1235, 50.75 ZL TV; 1835 — 1935, VK4ZIM, VK4EN, S9. 5/4, 1135, 52. VK5MT, S8. 6/4, 1135 — 1150, 53.00, VK5VF 9 beacon) S8. 7/4, 1110 — 1130, 52. VK5, 7. 8/4, 1110, 50.75, ZL TV S8. 9/4, 1830, 50.75, ZL TV, S8. 1830 — 2128, 49.75, TV video S8 fading. 2030 — 2100, 52., VK4. 10/4, 1100, 53.00, VK5VF, S8. 1204, 52.1, VK6ZBM, S5. 1214, 52.010, VK4GS, S8. 11/4, 1505 — 1540, 49.75, TV video, S9+. 2100, 52. VK7AW S7. 12/4, 1150, 52., VK5 and 7. 1715 — 1725, 49.75, TV video, S3 fading. 1840, 49.75. TV video, S6. 13/4, 1115, 52., VK5. 1355, 52., VK4RO, S8. 1900 — 2100, 49.75, TV video,

S6 fading. 1930 — 2030, 52., JA3, JH3, JR3, 4, 6, 9, 5 and 2. VK4EN heard calling CQ same time. 14/4, 0810, 50.1 AM, unidentified American calling CQ. Rapid fade. Lasted for about 10 secs. 0815, 50.15 CW. Too fast to copy. Same fade. (Both signals peaked N.E.). The openings to JA etc. on 13/4 all had trans-equatorial type flutter on the signals.

Now that's quite a presentable list. Not everbody can be around during the morning times, but does indicate that those who are home might listen and call more often. Roger VK2ZTB adds that the JA signals heard and worked on 13/4/74 were the first recorded instance of Class 2 (night time) T.E.P. being worked in the Sydney area. As VK4EN was heard at the same time, it appears that Es extended the T.E.P. path down to Sydney. A series of recurrent magnetic storms brought the good Es and T.E.P. conditions during late March and through April.

Over the years I have found the TV video from Vladivostok on 49.75 MHz quite a good indicator for band conditions, and when this signal rises to S9 as it often does, lots of other signals are to be found on the 50 to 51 MHz portion of the band. There is no doubt we do miss many rare contacts due to the 2 MHz band separation with the rest of the world, and reluctance of many VK's to tune below 52 MHz. And conversely the reluctance of other areas to tune up to 52 MHz.

Typical of what there is to hear if you are around and listening carefully was indicated by Roger VK2ZTB when in May he heard a station on 52.160 peaking broadly S.W. to S.E. at 2255 E.S.T. with distinct auroral "growl" on it, S1 to 4 with slow deep QSB. Occasionally the growl would disappear and a clear heterodyne could be heard. CW ident was obvious on the signal but too difficult to copy owing to extreme roughness. During the time Roger listened he copied several distinct "pings" and one good "burst", quite reminiscent of meteor scatter signals. If you are at all keen on looking for the rare signals this is the type of thing you may hear, and often monitoring the signal for a while will result in identification. Of course, if you only want to work the S9 signals, this type of reception is not for you, but the true DX-er hunts around in the noise for the weak ones and sometimes lands a good one. He also monitors a beacon frequency of some area when in the shack and not specifically operating.

Incidentally, if you are not sure of your frequency readout to a few hundred cycles, and you will need to be this close for monitoring purposes, the R.S.G.B. handbook has a circuit of a crystal calibrator especially designed for V.H.F. operation, at least to 144 MHz. It provides 1 MHz, 100 KHz and 10 KHz marker points up to 2 metres, the addition of a 52 MHz coil to the circuit would provide similar signals for that band. Only requires a 1 MHz crystal. Take a look at it.

VK5 REPEATER

A message from Ian VK5WB advises he and Garry VK5ZK have been doing some additional work on the Adelaide repeater with the aid of a diplexer built by Colin VK5HI. The repeater has been successfully fired into a single antenna using the diplexer, antenna gain 6 dB.

The repeater ran well, no detuning effects noted. Later a high gain antenna was installed, consisting of a ¾ wavelength collinear followed by a phasing section and a ⅝ wavelength above that. Good reports have been received, so an increased potential now exists for long distance stations to hear or work through the repeater. An article will probably appear in "Amateur Radio" on the construction work. At present there are more than 200 stations in Adelaide and surrounding areas using the repeater.

MOONBOUNCE

The Dapto Moonbounce Group have continued their tests with RTTY equipment. The receiving system constant-current teleprinter magnet driver was made to work and is an improvement over the use of polar relays. A new transmitter oscillator interface was made up to go with the receiving unit, and tests on 7 MHz have proved the system to be operational.

QSL cards were received from G3LTF to confirm the E.M.E. contacts on 30/3 and 31/3, which received world wide publicity for VK2AMW.

E.M.E. tests were carried out on 27th April with K2UYH, W4NUS, W0YZS, W8YIC, and W0EYE. A good CW contact was had with K2UYH but he did not have RTTY equipment available. However, he taped some of the VK2AMW RTTY transmission, and advice is now awaited if there is any printout. A signal was copied at one stage during the tests with W4NUS but not good enough to make a contact. The others were not heard.

Operators at VK2AMW during these tests were VK2ALU and VK2ZEN, whose CW is getting better as the result of moonbounce CW practice. Thanks to Illawarra Branch of WIA Newsletter for this information.

While still on moonbounce, a few words from Ron VK3AKC indicates he has not been idle. During April an attempt at E.M.E. was made with W9WCD. He was not heard, and since then Ron has found out he is horizontally polarised, instead of circular. A sked with G3LTF on 27/4 did not materialise as he was not on. On 28/4 Ron heard two PA0 signals. Another interested station is OZ9CK in Denmark. Ron's dish antenna on 1296 MHz has a beam width of only 3 degrees, so accurate aiming is very essential.

STATE OF THE ART CONTEST

Amateur Communications Advancements, publishers of 6 UP, are again sponsoring a VHF/UHF/SHF Contest, duration 0001 hrs. 20/7/74 to 2359 hrs. 17/8/74, operating period for scoring purposes being any 20 days in that period. One division, transmitting open, available to fixed, portable or mobile stations. All VHF/UHF/SHF bands, including net frequencies, may be used. No crossband contacts for scoring purposes, excepting via Oscar satellites, cross mode contacts permitted. Contacts via terrestrial and satellite repeaters are permitted as are EME contacts.

One contact per band per station per day permitted for scoring purposes. (Exceptions: Oscar, SHF stations, UHF/SHF field stations). A station working through an Oscar satellite may work the same station on not more than 2 different orbits/day. A station operating on an SHF band (2304 MHz and above) may work the same station on the same band twice in one day provided 2 clock hours have elapsed from the start of the first contact to the start of the second. A UHF/SHF field station is defined as a station operating with a portable power supply and antenna systems and would NOT be considered a mobile station in the normal manner. Scoring as for SHF band stations for 2 contacts/day.

The usual RS/RST report followed by three digits is to be used. Serial numbers NEED NOT commence at 001 and need not be consecutive. The usual method starting at 001 and increasing by one for each contact may be used or the non-consecutive system at operator's discretion. All clock times to be E.A.S.T. and distances in miles (for 1974). Contacts via Sporadic-E and Tropospheric duct propagation will be disallowed, the judges decision being final.

All logs to be sent to "6UP State of the Art Contest Manager, 4 Tiranna Place, Oyster Bay, N.S.W. 2225", not later than 16/9/74, and contain the following information: date and time of contact, band, emission, callsign of station worked, report and serial numbers sent and received, distance, points claimed. A comment on antennae/power/field QTH would be of interest.

SCORING for all contacts above the minimum distance appropriate to the band, with the exception of repeaters, will be based on the mileage between stations multiplied by a band factor. Where the stations (not using a repeater) are within the minimum distance contacts score at the numerical value of the band factor, no mileage.

TERRESTRIAL REPEATERS: The minimum distance station-to-repeater-to-station to be 3 times the minimum scoring distance for a direct contact, otherwise scoring at the band factor per contact, no mileage. (Note: No direct distance station-to-station is laid down for a valid greater-than-minimum distance repeater contact, but the stations must each be operationally independent of each other.)

OSCAR SATELLITES: Scoring is based on geographically adjacent and non-adjacent call areas. VK7 and VK3 are considered to be adjacent; VK9, VK0 and all other prefixes except ZL are all considered mutually non-adjacent. VK to ZL and vice-versa are non-adjacent.

EME. Contacts via the moon score at the rate of 3000 points regardless of frequency, prefix etc.

OSCAR: Geographically adjacent call areas 100 pts/contact. Non-adjacent call areas 200 pts/contact. Contact to or from a call area not VK1 to VK8, or ZL1 to ZL4 inclusive, 500 pts/contact.

SCORING TABLE:—

BAND MHz	Direct minimum distance	Band factor
52	50	1
144	50	2
432	25	8
576	25	16
1296	25	24
2304 and above	10	50

The indirect minimum distance for 144 MHz is 150 miles (3 x 50 — see under Terrestrial Repeaters above).

Enhanced meteor shower activity should be evident 27/7/74 through to 1/8/74 (IGY Calendar 1974).

First and second prizes are to be awarded, all other entrants will receive a suitable certificate with their score and overall place inscribed.

I commend this Contest to VHF/UHF operators. If it does no more than to bring on some extra stations it will be worth while, but in so doing we may learn just how much can be heard on 52 MHz and above at a period when there usually is not a great deal of activity. Maybe some of the former active Western Victorian stations of a few years ago could be induced to brush the cobwebs from their 2 metre equipment and give a few early morning contacts to others. **A station** may be heard in VK5 on 2 metres as well, because there haven't been any lately! Apart from all the f going, it will be a good lead into the Remembrance Day Contest, the last six hours of the State of the Art Contest runs parallel with the R.D Contest first six hours.

REMEMBRANCE DAY CONTEST

I am sure the Contest has been getting friendlier every year, and I view with pleasure the greater participation by VHF stations. The Federal Contest Manager Peter VK4PJ made this point in his comments on the 1973 RD Contest: "This is the year that the VHF fraternity showed their ability with some effect. Note the number of VHF scorers, generally the point score is close to the number of contacts, in VK5, 6 and 7. Apparent to me was the number of HF operators who also scored many single points on VHF, realising that every VHF contact was two points to their State." There is sufficient justification for the VHF gang to get right into it. Last year VK5ZGZ scored 191 points for 191 contacts, he also gave 191 points to other VK5's as well. I now note VK5ZCP had 207 contacts, and VK5 had 8 other Z calls with 100 or more contacts. What a magnificent score these chaps provided for their State, the same applying to other States too but to a lesser extent. So get into it chaps, it's a great contest on the third weekend in August 1974.

VK2ZQJ

Since moving to Sydney from VK5 several years ago, Rod VK2ZQJ continues to keep the VHF/UHF scene operating, and is probably as well set out as any other station around the country. Equipment is as follows: 52 MHz, 300W out SSB to 4 over 4 at 55 feet. 144 MHz: 300W out SSB to four 10 elements at 65 feet; 432 MHz: 250W out SSB to four 11 elements at 75 feet.

Also on 144 MHz a pair of 10 element yagis crossed are switchable from the shack for LH, RH, vertical and horizontal, steerable both azimuth and elevation. This is used for Oscar and with 80W of FM on nets instead of a dipole.

On 1296 MHz a six foot dish at 50 ft. is fed with Heliax, only receiver at present, but transmitter underway. The receiver will be in the next issue of 6 UP. The new Tx will use a more conventional SSB approach and run 250W into a pair of 3CX100A5's.

Down on 29.5 MHz Rod uses a quarter wavelength, or sometimes quad fed dipoles, for Oscar. For RTTY a phase locked loop and solid state printer driver are used . . . from VK6 VHF Bulletin.

In addition Rod has a crystal set for B/C listening!

That's all for this month, so will close with the following thought: "To go against the dominant thinking of your friends, of most of the people you see every day, is perhaps the most difficult act or heroism you can perform".

The Voice in the Hills. ●

Rules for the 1974 Rememberance Day Contest 17 & 18 August

A perpetual trophy is awarded annually for competition between Divisions of the Wireless Institute of Australia. It is inscribed with the names of those who made the supreme sacrifice and so perpetuates their memory throughout Amateur Radio in Australia.

The name of the winning Division each year is also inscribed on the trophy and in addition, the winning Division will receive a suitably inscribed certificate.

OBJECTS. Amateurs in each VK call area (including Australian Mandated Territories and Australian Antarctica) and P2 (Papua New Guinea) will endeavour to contact amateurs in other VK, P2 and ZL areas on all bands.

Amateurs may endeavour to contact any other amateurs on the authorised bands above 52 MHz, (i.e. intrastate contacts will be permitted in the VHF/UHF bands for scoring purposes).

CONTEST DATE: 0800 hours GMT on Saturday 17th August, 1974, to 0759 hours GMT on Sunday 18th August, 1974.

All amateur stations are requested to observe 15 minutes silence before the commencement of the contest on the Saturday afternoon. An appropriate broadcast will be relayed from all Divisional stations during this period.

LES

1. There shall be four sections to the contest —
   (a) Transmitting, phone.
   (b) Transmitting, CW.
   (c) Transmitting, open.
   (d) Receiving, open.
2. All Australian Amateurs and those in Papua/New Guinea may enter the contest whether their stations are fixed, portable or mobile. Members and non-members are eligible for awards.
3. All authorised Amateur bands may be used and CROSSMODE OPERATION IS PERMITTED. Cross-band operation is not permitted.
4. Amateurs may operate on both "phone and CW during the contest", i.e. 'phone/'phone, CW/CW, or 'phone/CW. However, only one entry may be submitted for sections (a) to (c) in Rule 1.
   An open log will be one in which points are claimed for both phone and CW transmissions. Refer to rule 11 concerning log entries.
5. For scoring only one contact per band per station is allowed. However, a second contact on the same band using an alternate mode is permitted. Arranged schedules for contacts on the other bands are prohibited. All CW/CW contacts count double.
   On bands 52 MHz and above, additional contacts may be made with the same station provided that two hours elapse after the previous contact with that station on that band.
6. Multi-operator stations are not permitted. Although log keepers are permitted, only the licensed operator is allowed to make contact under his own call sign. Should two or more wish to operate any particular station each will be considered a contestant and must submit a log under his own call sign. Such contestants shall be referred to as "substitute operators' 'for the purpose of these rules and their operating procedures must be as follows:
   PHONE. Substitute operators will call "CQ RD, or CQ Remembrance Day" followed by the call of the station they are operating, then the word "log" followed by their own call sign, e.g. "CQ RD from VK4BBB log VK4BAA".
   CW. Substitute operators will call "CQ RD de followed by the group call sign comprising the call of the station they are operating, an oblique stroke and their own call", e.g. "CQ RD de VK4BBB/VK4BAA".
   Contestants receiving signals from a substitute operator will qualify for points by recording the call sign of the substitute operator only.
7. Entrants must operate within the terms of their licence.
8. CYPHERS. Before points may be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of 5 or 6 figures will be made up of the RS (telephony) or RST (CW) report plus 3 figures that will increase in value by one for each successive contact. If any contestant reaches 999 he will start again with 001.
9. ENTRIES must be set out as shown in the example, using one side of the paper only and standard WIA log sheets if possible. Entries must be clearly marked "Remembrance Day Contest 1974" on the envelope and must reach the Federal Contest Manager, WIA, Box 67, Post Office, East Melbourne, Vic., 3002 in time for opening on Friday, 20th September, 1974. Early entries will be appreciated.
10. Scoring will be based on the table shown.
    Portable operation: Log scores of operators working outside their own call area will be credited to that call area in which operation takes place, e.g. VK5ZP/2. His score counts toward VK2 total points score.
11. All logs shall be set out as in the example shown and in addition will carry a front sheet showing the following information:
    Name .....
    Address .....
    Section .....
    Callsign .....
    Claimed score .....
    Number of contacts .....
    Declaration: I hereby certify that I have operated in accordance with the rules and spirit of the contest.
    Signed .....
    Date .....
    All contacts made during the contest must be shown in the log submitted — See Rule 4. If an invalid contact is made it must be shown but no score claimed.
    Entrants in the "Open" sections must show CW and phone contacts in numerical sequence.
12. The Federal Contest Manager has the right to disqualify any entrant who, during the contest, has not observed the regulations or has consistently departed from the accepted code of operating ethics. The Federal Contest Manager also has the right to disallow any illegible, incomplete or incorrectly set out logs.
13. The ruling of the Federal Contest Manager of the WIA is final and no disputes will be entered into.

AWARDS

Certificates will be awarded to the top scoring stations in Sections (a) to (c) of rule 1 above, in each call area, and will include top scorer in each section of each call area operating exclusively on 52 MHz and above. VK8, VK9/1, VK9/2, P2, ZL1, ZL2, ZL3, ZL4 and ZL5 will count as separate areas for awards. There will not be an outright winner. Further certificates may be issued at the discretion of the Federal Contest Manager.

The Division to which the Remembrance Day Trophy will be awarded shall be determined in the following way—

Average of top six logs
+ **Logs entered** State licencees
X Total points from all entrants in Sect. (a, b, c).

VK8 scores will be included with VK5, VK0 with VK7 and P2 with VK4. Also VK9 logs and score will be added to the Division which is geographically closest. ZL scores will not be included in the score of any WIA Division.

Acceptable logs for all sections shall show at least five valid contacts. The trophy shall be forwarded to the winning Division in its container and will be held by that Division for the specified period.

RECEIVING SECTION (Section d)

1. This section is open to all short wave listeners in Australia, Papua/New Guinea and New Zealand, but no active transmitting station may enter.
2. Contest times and loggings of stations on each band are as for transmitting.
3. All logs shall be as set out in the example. The scoring table to be used is the same as that used for transmitting entrants and points

SCORING TABLE FOR PHONE CONTACTS — ALL CW/CW CONTACTS COUNT DOUBLE

From	To VK0	VK1	VK2	VK3	VK4	VK5	VK6	VK7	VK8	VK9/1	VK9/2	P2	ZL1	ZL2	ZL3	ZL4	ZL5
VK0	—	6	6	6	6	6	6	—	6	6	6	6	2	2	3	4	1
VK1	6	—	1	1	2	3	5	4	6	5	1	5	1	2	3	4	6
VK2	6	3	—	1	2	3	5	4	6	5	—	5	1	2	3	4	6
VK3	6	4	1	—	2	1	4	3	6	5	4	5	2	2	3	4	6
VK4	6	3	1	2	—	3	6	5	4	3	3	—	3	3	3	4	6
VK5	6	5	2	1	3	—	4	3	—	6	6	6	4	4	4	5	6
VK6	6	6	2	1	4	2	—	3	5	—	6	6	4	4	5	6	6
VK7	—	5	1	1	3	2	5	—	5	6	6	6	2	2	3	4	6
VK8	6	5	1	1	2	—	6	4	—	3	4	3	4	4	6	6	6
VK9/1	6	5	1	2	3	4	—	6	1	—	6	3	5	5	6	6	6
VK9/2	6	1	—	2	2	4	5	4	4	6	—	3	1	2	3	4	6
P2	6	5	1	2	—	4	5	6	1	3	3	—	5	5	6	6	6
ZL1	6	1	1	1	2	2	5	3	5	6	5	6	—	—	—	—	—
ZL2	6	1	1	1	2	2	5	3	5	6	5	6	—	—	—	—	—
ZL3	6	3	3	3	4	4	6	4	6	6	5	6	—	—	—	—	—
ZL4	6	4	4	4	5	5	6	5	6	6	5	6	—	—	—	—	—
ZL5	1	6	6	6	6	6	6	6	6	6	6	6	—	—	—	—	—

Read table from left to right for points for the various call areas. VK9/1 means VK9 stations on Indian Ocean Islands. VK9/2 means VK9 stations on the Pacific Ocean Islands. In addition, all instrastate contacts on 52 MHz and above are worth one point per band.

EXAMPLE OF TRANSMITTING LOG

Date/time GMT	Band	Emission Power	Call sign Worked	RST Sent	RST Rec'd	Points

EXAMPLE OF RECEIVING LOG VICTORIAN SHORT WAVE LISTENER

Date/time GMT	Band	Emission	Call sign heard	RST sent	RST recd	Station called	Point claim
Aug. '74							
18/0612	7 MHz	A3	VK5PS	58002	—	VK6RU	1
18/0615	7 MHz	A3	ZL2AZ	59103	—	VK3KI	2
18/0700	52 MHz	A3	VK3ALZ	57012	—	VK3BQ	1
18/0723	52 MHz	A3	VK4AZ	56013	—	VK5ZDR	2

must be claimed on the basis of the State in which the receiving station is located. A sample is given to clarify the position. It is not sufficient to log a station calling "CQ" — the number he passes in the contact must be logged. It is not permissible to log a station in the same call area as the receiving station on the MF and HF bands, (1.8-30 MHz), but on bands 52 MHz and above, such stations may be logged more than once per band, for one point on each occasion. See example given.

4. A station heard may be logged once on phone and once on CW for each band.
5. Club receiving stations may enter for the receiving Section of the Contest but will not be eligible for the single-operator award. However, if sufficient entries are received, a special award may be given to the top receiving station in Australia. All operators must sign the declaration.

AWARDS

Certificates will be awarded to the highest scorers in each call area. Further certificates may be awarded at the discretion of the Federal Contest Manager. ●

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST DIARY CALENDAR

July 20th-21st—Colombian Contest Phone & CW
July 27th-29th—County Hunters CW Contest (USA)
August 10th-11th—Argentina phone contest
August 10th-11th—European CW Contest
August 17th-18th—**REMEMBRANCE DAY CONTEST**
August 24th-25th—All Asian CW Contest

(THE FRIENDLY CONTEST) NOTES FOR 1974

At the Federal Convention held in Sydney during Easter, 1974 the rules for the RD Contest were altered to provide for CW/CW contacts to score double the points set out in the scoring table. It was also decided that repeaters could not be used and that for the purposes of this contest, operators in Papua/New Guinea (P2) would be included as for VK9 operators. VK1 is now a separate Division.

We received 719 logs after the 1973 RD contest and as comment generally favoured the rules no other alterations were made. Some changes in the scoring table have been made.

FOR 1974 RD

Make sure that everyone you contact enjoys the Contest and there will be no doubt that you will enjoy it.

Make sure that we achieve at least 800 log entries by talking about the contest with all your friends, on and off the air.

Make sure that your Division puts up a good show. Help the ZLs with their MEMORIAL CONTEST 80 metres on 6th/7th July. ●

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA, 5152.

DXCC (ARRL)

1. The ARRL has decided that confirmations of contacts with both VK9JW and VK4FJ/Mellish Reef will be accepted for DXCC credit. QST March '74.
2. Because of the continuing rise in postal rates in the USA, all new DXCC applications must be accompanied by US$3.50 (or the equivalent in IRCs). This covers the cost of returning the cards by registered first class mail as well as a certificate and DXCC lapel pin. New DXCC applications received 1st July 1974 and after will, if the $3.50 is not sent with the application, be delayed in processing until the applicant has submitted the necessary amount.

FIVE-BAND AND SIX-BAND WORKED ALL CONTINENTS AWARDS

The International Amateur Radio Union announces the availability of five-band and six-band versions of the popular Worked All Continents award. These new awards are intended to promote the more uniform use of the high frequency amateur bands for international communication and to recognise outstanding achievement by amateur stations in establishing two-way communication with the six continental areas of the world on each of the amateur bands available for such communication.

The following rules apply:

1. The basic award shall be known as "Five-Band Worked All Continents" ("5BWAC"). An endorsement for "Six-Band Worked All Continents" ("6BWAC") shall be available upon submission of proof of this additional accomplishment.
2. Applications shall be sent by the applicant, accompanied by the originals of the required confirmations, to the headquarters of the member-society for the country in which he resides (VK hams contact the Awards Manager). The Awards Manager shall then examine the application and, if it is found to be satisfactory shall so attest to the Headquarters Society, ARRL, which shall issue the certificate and deliver it directly to the applicant. If the applicant resides in a country not represented in the Union, the application shall be sent directly to ARRL.
3. Where the applicant resides in a country which is represented in the Union, it shall be necessary for him to hold membership in the representative member-society in order to be eligible for the award.
4. The continental boundaries defined in the WAC rules shall apply to 5BWAC and 6BWAC.
5. To be used toward the award, contacts must be made from one station (in terms of licence and call letters, but not necessarily of equipment) operated at one location. The term "location" shall be construed as representing one metropolitan area, or, alternately, an area not exceeding 25 miles (aout 40 km.) in diameter.
6. Contacts must be made on or after 1st January 1974 to be used in qualifying for this award. ●

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,
Dear Sir,

I have a problem. On page 10-40 of "Radio Communication Handbook" it says "a peak in screen current indicates tank circuit resonance". I tried measuring the screen current of my final, a pair of 6146s, and found it behaved the same as the plate current.: It dipped on resonance of the final tank circuit. No grid current was flowing either. Can any of your readers assist me.

J. Kitchin, VK6TU

Albany House, Goonown
St. Agnes, Cornwall TR5007

The Editor,
Dear Sir,

I have been a reader of AR for some years and find it most interesting. Its now 30th May and I have just received my April issue. I was very interested in VK3AVO's article on the G5RV. I have used this aerial for many years and having tried many others I have always come back to the G5RV. I have not slotted my feeders but I spray them with a water repellent such as used for car ignition and wiring. I do this about every three months. Unlike VK3AVO I do use an ATU in the form of a "Z Match' and can load up on 80.40 and 20 with very low SWR. I have found trimming the 300 ohm stub better than the top, cutting it back ½ inch at a time. My 300 ohm stub is 29 foot 3 inches. On 160 I use it without the ATU but seem to get just as good reports with the feeders open as when strapped. I use a small AM & CW rig on this band.

I have a very good take off. My QTH is ¾ mile from the Atlantic Coast and 350 ft ASL. The aerial is about 36 ft above ground. I find the G5RV as good an aerial as any (excluding beams of course). Providing it is adjusted and matched properly. When conditions are right I have not any trouble in working DX on 80 including ZL, W, VE, PY, in fact most of South America. I have worked all over the world on 40 including many VKs but 20 is my best band.

I have quite a few awards including the WIA Cook Bi-Centenary Award. VK3GS and myself have worked one another 277 times in the last 3½ to 4 years. I think this goes to prove the GSRV is quite a good aerial. What is my gear 500 watts? No! A little "National NCX3", 120 watts pep. I have never used any higher power on any band.

Yours sincerely,
J. E. Bowden
(Ted) G2AYQ

Key Section

with Deane Blackman VK3TX
Box 382, Clayton, Vic., 3168

People who write for magazines can always tell if their stuff is being read because their readers write in and tell them they are wrong in what they have said. Following my comments about the location of the key near (or not near) the edge of the table, I have been told that I implied that the correct method of using the key is to have the forearm resting on the table. Re-reading what I wrote, I did not think I had implied that, but perhaps the point is worth a further comment anyway — based on my ignorance. I was under the impression that the recommended British Post Office method, and which is (should I say has been?) the Australian practice, is to place the key near the edge of the table and to operate with the upper arm hanging loosely from the shoulder. I am also under an impression that the technique of resting the forearm on the table, with the key some 20-30 cm from the edge, is popularly called the 'American' method, though no doubt with as much justification as calling it 'French cricket' or 'Dutch auction'. If that is not an invitation for ten people to rise up against me then I'll go he.

I imagine there will be some who think the matter of no consequence; who uses a hand key anyway? Well, apart from the exam problem, I will show myself to be very old fashioned by saying that, even if you usually use an electronic key, I think you ought to be able to at least use a hand key. Before leaving hand keys I should also perhaps mention that Bail Electronics thought I had given a slightly misleading impression about the height of their HK-701 key. I think they may be right, and refer you to the report on the key by Ivor VK3XB; I passed on a comment from Ivor received by phone and as is usual in such cases dis'orted the facts without meaning to.

Congratulations to Bill, VK2YB, who won the 6-hour section B, and to VK3ANU who won the 24-hour section B, in this year's national field day contest. There is something ominous about the fact that there is only one entry in section C (transmitting open) — no doubt we will be more broadminded in the RD next month?

The Townsville Amateur Radio Club tell me they are starting slow morse transmissions. These may be heard on Mondays at 1930h on 3580 kHz. A good service I would think as the tropical static must make a terrible mess of the ever-faithful VK2 transmissions. I had QSO with VK3WS, who had just given one of the Western Suburbs Radio Club broadcasts on 1806 kHz, and he told me he thought that service was also attracting enough support to make it worth while. ●

Historical Section wants old mags, papers, articles, photos, drawings—up to W.W.2—for copying or as donations. Please write VK3ZS, QTHR or WIA Executive office.

Product Review

DICK SMITH ELECTRONICS CATALOGUE, 1973/74, 3rd EDITION

Back in March 1973 issue of AR we reviewed Dick's 2nd Edition cata'ogue. It contained 44 pages of the good oil, and this issue is even better having 64 pages, an increase in size of 45 per cent in under 18 months.

I believe that every aspiring or established amateur should have a copy of Dick's catalogue as it contains so much general information for both the audio man and the electronics experimenter-amateur operator. There are photographs of many of the items for sale, as well as general information on applications of various components.

I have not had a great deal of time to thoroughly peruse the catalogue, as I had back in 1973, but everything looks as good if not better. I commented on a few things in the previous ca'alogue. For instance that the Gippsland repeater was not on Mt. Bess but on Mt. Tassie. One point I made in particular was about the advertising of transmitting gear, namely 27 MHz equipment. Dick has taken the trouble in several places in his catalogue to point out that not only must this type of gear be **PMG approved** but **must be licenced before being put into use.** Possibly Dick is unique in the business world of bringing these points to the customers' notice. Could save many innocent people much heartache later on.

Page 41a is general information for the SWL or amateur on bands, nets, magazines, etc. For the 2 metre FM man Dick has a complete RF amplifier system with an output of 25 watts advertised on page 38a, information on the transistors and he does have printed boards for this unit.

There is much I could say about the catalogue — but there is no substitute to having your own. Dick is offering them free to readers of **Amateur Radio** complete with the free vouchers. What better offer could you get. I personally have been quite satisfied with the service I have received from Dick. Remember when you write to Dick, say you saw it advertised in **Amateur Radio.**

VK3UG

WARNING

In terms of PMG directions* from 1.3.1974
UNDELIVERABLE and UNDELIVERED A.R.'s
WILL **NOT** BE RETURNED TO SENDER
Unless you advise your
CHANGE OF ADDRESS
to the Executive Office
P.O. Box 150, Toorak, Vic., 3142
at least one month in advance
you may miss your A.R. No replacement can be sent to you unless accompanied by 70 cents per issue (subject to copies being available.)

The above applies only when you change your address

* Letter V 228/1/17 of 30.11.1973 (services)

Book Review

"THE WHAT WHERE WHO HASSLES AND HOW MUCH BOOK" Edited by Roger and Valerie Harrison Where can you get a length of FHJ4 "Heliax?" Who has wind driven power supplies? Where can you see an Aardvark?

Anybody who is a serious amateur (or professional) experimenter will from time to time require something that isn't stocked at the local TV repair shop or supermarket. The Harrisons, with their "The W.W.W.H. & H.M.B." have provided us all with a valuable directory to those firms in Australia, N.Z. and overseas, that can help us in our quests for chart recorders, Q meters and coax. The 24 headings include Aardvarks, AR, Antennas, Books, Cables, Disposals, Kits, Media, PCBs and Tools and cover over 270 Firms.

If you are content only to operate then forget it, but if you are into any kind of project or experimenting, then the $1.50 will be very well spent.

ROLY ROPER

Hamads

* Eight lines free to all W.I.A. members.

* Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150 Toorak, Vic., 3142.

FOR SALE

Frequency Meter BC22IT(Q), AC Power Supply and Calibration book, Perfect condition, $35. **Panoramic Adapter BC1031A,** 455kc/s IF, mint condition, $35.

3APC Transistor Receiver and **2m Converter,** tunes 3-5.1 Mc/s, $35. **STC 121** FM carphone, almost modified for 6m, circuits and xtals, Runsa 3/20 Final, $25. VK3ZBD, QTHR. Ph.: (03) 892117.

Eddystone EC10, Lafayette HA 600 receivers, frequency meter BC-221-E, very good condition. Command transmitter covering 3.5 MHz CW, excellent condition. All offers considered. VK4WR, 6 Olive Ct., Nambour, Qld., 4560.

Yaesu FTDX400 with Yaesu blower fitted and matching FVDX400 external VFO, mint condition, $430, O.N.O. VK2WD, QTHR. Ph.: (02) 42 6080.

Swan 350 SSB Transceiver, AC and DC (mobile) PS, excellent condition, with manual. What offers? VK3ADN, QTHR, but Post Code 3324. Phone Lismore 139 (evenings).

FT101 Transceiver, 160-10m complete with fan mic., manual, AC/DC plugs, excellent order and condition. Recent model with FB noise blanker. $450. VK3BM, Box 724, Swan Hill 3585. Ph: (050) 32 4102.

Yaesu FT200 with FP200 power supply and manual, as new condition, $350. VK3RD, QTHR. Ph: (03) 57 8272.

Yaesu FT-101 with matching speaker and remote VFO, used few hours only, $450. 18AVQ vertical, $40. Vinton 2m fm base 90w transceiver, $35. VK3CH, QTHR. Ph.: (03) 91 1030 anytime.

Galaxy GT550 transceiver with matching speaker cabinet, built in PSU. Excellent order and condition, $400. VK7MG, QTHR. Ph: Swansea 220.

Yaesu FT-2F. 2FM with A, B, C, R1 and R4 plus 3 other channels. Complete with 240 volt power supply and battery, $200. **Trio TR-2E.** 2 metre AM/FM 12 volts/240 volts. Fully tuneable transmitter and receiver. 10 watts out., $120. Both complete with microphones, brackets, manuals, etc., Contact Ray VK3ZRG on 80-2636 or at 1/2 Thomas Street, Kew, Vic., 3101.

WANTED

Does Anyone know a source of supply of Biltong or Pemmican. VK3CIF, QTHR.

FT200 or similar transceiver. Price and particulars to G. Noble, 32A King St., Bellerive, Tas., 7018. Include Ph. No.

Hallicrafters sx62A radio receiver. Details to F. Hill, VK2HQ, QTHR.

Conversion Data and circuit diagram of AWA Model LJ59434 FM mobile transceiver. Contact David Green, WIA SWL L40501, 258 Tooley St., Maryborough, Qld. 4650.

DC/DC Converter, suitable FT200. 12V or 200 club transformers or core and winding details for 2N3055. VK2ATI, QTHR.

EXCHANGE

Yaesu FL200B and **FR50** in good cond. for **FT200** with **FP200** AC PSU. Cash adjustment, prefer **VK3** enquiries only, you deliver and collect. VK3ACM, (ex VK3YBO, QTHR). Ph: (061) 68 2260 AH only.

Magazine Index

With Syd Clark, VK3ASC

This month the series of magazines are recent and consecutive except for 73 which appears to have been waylaid for about four or five months. Reading these mags is an interesting pastime and some excellent gear is described for "Home-brewers".

BREAK-IN. March 1974
Ideas for Building Transceivers; A Simple Receiver for the New Amateur; Kingsford Smith and the "Southern Cross"; Bench Power Supply.

BREAK-IN. April 1974
Ideas for Building Transceivers (Ends).

QST. March 1974
The Half Square Antenna; A Competition Grade Receiver, Part 1; A Complete FM Transceiver, Part 2; The Constant Impedance Trap Vertical; A Receiving Loop for 160 Metres; Making Your Own Satellite Tracking Nomograph; A Simple Method of Raising Large Antennas; Pulse Modulation — A New Look at Old Theory; A Frequency Extender for Electronic Counters.

QST. April 1974
A Four-Band Whopper; A Simple and Efficient Mixer for 2304 MHz; Another Look at Reflections, Part 5; A Tone Burst Generator for Repeater Access; A Competition Grade Receiver, Part 2; Modernisation of an old favourite; Monitoring an SSB Amplifier Chain for Linearity; Learning to Work with Semiconductors, Part 1.

RADIO COMMUNICATION. April 1974
Conversion of Storno Viscount VHF Radiotelephones for Amateur Service; Using the Heathkit SB610 Scope with the Drake Line; Building Blocks for the Novice; Technical Topics and other features.

73 MAGAZINE. December 1973
IC Code Speed Display; 2 Metre Linear Amplifier; A Simple IC Keyer; Precision Waveform Generator; Helical Resonators; Sensitive RF Voltmeter; The Greenie; Rapid Receiver Control; Increasing SSB Efficiency; Identifying unmarked IC's; The QSL from BY Land; Sequential 2-Tone Decoder; A Satisfying Minimum Regulator; Take-Apart 2 Metre Beam; Making the Most of Auto-ID; Choosing and Using an Electronic Calculator; Optimum Design of CW Filters; Amateur Rules and Regulations, Part 7.

CQ.TV. The Journal of the British Amateur Television Club. December 1973 and February 1974
The Dec. issue; A Synchronising Pulse Generator. Feb.: Some Notes on the SM0BUO Slow Scan TV Monitor; A Programme for the Future; ATV Contest News; Fourth Worldwide SSTV Contest. ●

Y.R.C.S.

with Bob Guthberlet

Methodist Manse, Kadina, S.A., 5554

An item of special importance will be presented to the meeting of State Supervisors at Maitland, N.S.W., concerning the appointment of a Federal Education Officer. It has been suggested that his duties should be as follows:—

(1) To advise the Federal Co-Ordinator and YRCS Council on matters relating to training, examination standards, training publications and related affairs;

(2) To be responsible to the Federal Co-Ordinator for the implementation of training policies and related affairs decided by the YRCS Conference;

(3) To maintain constant consultation with State Supervisors, State Education Officers, Instructors and Club Leaders on matters relating to training, examinations and standards, training publications and other related affairs;

(4) To establish an Australia-wide system of examinations to maintain standards of uniform level in all States;

(5) To maintain a system of records and statistics in order to supply such information as required by the Federal Co-Ordinator and/or YRCS Conference;

(6) To furnish to the Federal Co-Ordinator such information, reports, statistics as may enable him to prepare a comprehensive report on educational and training matters prior to and for submission to the YRCS Conference;

(7) To undertake duties as Chairman of Educational Committee(s) as may be convened by direction of YRCS Conference from time to time.

(8) To submit recommendations, suggestions, opinions as may be required by the Federal Co-Ordinator and/or YRCS Conference;

(9) To carry out such other duties as may be required by the Federal Co-Ordinator and/or YRCS Conference.

It will be seen from the above that the position of YRCS Federal Education Officer will require the appointment of someone with time and the necessary expertise for this very important office.

Another matter which involves our constitution is that of the appointment of the Federal Co-Ordinator. No tenure of time is mentioned in the constitution, and it is my opinion that the office should be declared vacant at each General Meeting, following which a nomination should be made and a name submitted to the Federal WIA Executive for approval.

With these and other items the Maitland Conference should not be dull. ●

Silent Keys

HENRY S. KING, VK2ASU

Henry was born at Tumbarumba, NSW, and joined the RAAF during World War 2 as Wireless Operator/Technician. Post war he was a PMG Technician until June, 1956, when he resigned to join the staff of Mullard Australia Ltd. to set up their Valve and Semiconductor Service Centre at Petersham, which he conducted, along with their interstate Service Centres, for a number of years. He rejoined the PMG's Department as Technician at Kempsey in February 1971 and remained there until his sudden and unexpected death on Sunday, 5th May, 1974, aged 56 years.

During 1950/51, Henry was Honorary Secretary to the WIA (NSW Division) and while holding this office, both he and his wife (Betty) spent many months updating the Division's Registers. Subsequent heavy workday commitments precluded his taking further active office with the Institute. Henry was a true Amateur, and although over the past few years his time on the air was confined to short periods on the 3.5 and 7 MHz bands, he continued to be an avid experimenter in aspects of semiconductor technology in both RF and AF fields. The quality of his workmanship was exceeded only by his deep knowledge of the theory behind it.

To all and sundry, Henry gave a lot of himself, and he will be sadly missed by his many friends to whom he had so often rendered so much personal service and advice.

We extend our deepest sympathy to his wife, Betty and to her family.

G. T. Slawson, VK2AFN

20 Years Ago

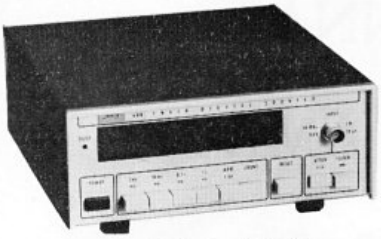
with Ron Fisher VK3OM

JULY 1954

The introduction of the Limited AOCP brought forth a bit of crystal gazing in the Editorial page of July 1954 Amateur Radio.

"There is no doubt that the VHF bands **will** be the universally used bands for future emergency communications networks and the introduction of the limited operators into these regions will ultimately benefit the amateur service and the country to a greater degree than is as yet realised". It might be well to remember that the Limited AOCP was gained directly by Institute representation as will be the yet-to-come Novice licence. Reports of contacts using transistorised transmitters came from England and New Zealand. The G's claimed 90 miles on 80 and 9 miles on 160, while from ZL a contact of 200 miles and reports from as far as 720 miles. The DX bands were in general erratic, with only 20 showing any signs of stable conditions. Only a single W6 was heard on ten metres.

Technical articles for July included, The Complete Amateur, part seven, function and master switch panel. Selectivity and Phone Reception. Some tricks with your present receiver, reprinted from QST. A Transmitter with AC/DC Power Supply, by Hans Albrecht VK3AHH. Ten watts output from AC or DC mains. Hetrofil. Chris Cullinan VK7XW shows how the Wien Bridge can be used to null out heterodynes in short wave reception. A full page spread describes the latest Eddystone receivers available from William Willis & Co. They include the 680X, 750, 740, and 840. ●



New Fluke Counter

ONLY $315 + 15% Tax

- ☐ 5 Hz to 40 MHz
- ☐ Measure frequency, read rpm directly or totalize events
- ☐ Big six digit display clearly readable from a distance
- ☐ Switchable low pass filter and attenuator for noisy electrical environments
- ☐ Optional BCD output and programmable offset
- ☐ 40 mV sensitivity
- ☐ Fluke quality at a rock bottom low price
- ☐ Functional "burn-in" to eliminate marginal parts

Think of it as the best tester in your bag. Only $245 plus 15% tax

Now you can get a high performance Model 8000A Digital V.O.M. from Fluke, America's foremost maker of quality digital mutimeters, especially designed for TV, radio, stereo and audio service. No other digital V.O.M. gives you the resistance range to check breakers and switches, the high resolution voltage to look at emitter base and other transistor voltages, excellent ac accuracy and full accuracy with a 30 second warm-up.

Measures in 26 ranges 100 uV to 1200 V, 0.1 uA to 2A, and 100 milli ohm to 20 meg ohm with a basic dc accuracy of 0.1%. Full year guarantee. Low cost options include rechargeable battery pack, printer output, 20 amps ac dc ranges, deluxe test leads, HV, RF & 600-amp ac current probes, carrying case, and rack mount. Unique self zero eliminates offset uncertainty. Electronics securely mounted in high-impact case.

ELMEASCO INSTRUMENTS PTY. LTD.

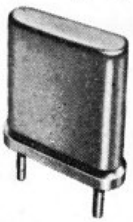
P.O. Box 334, Brookvale, NSW 2100 — 939 7944

Melbourne: 26 6658; Adelaide 264 3296; Brisbane: 71 3366; Perth: 25 3130; Wellington N.Z.: 63976

BRIGHT STAR CRYSTALS

- **PROMPT DELIVERY GUARANTEED**
- **ALL TYPES OF MOUNTINGS**

Such as HC6/U (style D) . . . HC18/U (style J) . . . HC25/U (style K) . . . etc. . . . Frequency range up to 140MHz on 5th overtone.



- **ACCURACY**
- **STABILITY**
- **ACTIVITY**
- **OUTPUT**

Our increased production now enables us to offer Special Discounts from 10%
Let us quote you for all your Crystal requirements.
Our easy-to-read Price List is now available.

BRIGHT STAR CRYSTALS PTY. LTD.

35 EILEEN ROAD, CLAYTON, VIC., 3168. Phone: 546-5076 (Area Code 03).

INTERSTATE AGENTS:

Sydney: PARIS RADIO ELECTRONICS, 7a Burton Street, Darlinghurst, N.S.W. 2010, Phone: 31-3273.
Perth: W. J. MONCRIEFF PTY. LTD., 176 Wiftenoon Street, East Perth,, 6000, Phone: 25-5722, 25-5902.
Brisbane: FRED HOE & SONS PTY. LTD., 246 Evans Road, Salisbury North, 4107, Phone: 47-4311
Adelaide: ROGERS ELECTRONICS, P.O. Box 3, Modbury North, S. A. 5092. Phone: 64-3296.

"WILLIS" AIR-WOUND INDUCTANCES

Take the hard work out of Coil Winding, use — "WILLIS" AIR-WOUND INDUCTANCES

No.	Dia. Inch	Turns per Inch	L'gth Inch	B. & W. Equiv.	Price
1-08	½	8	3	No. 3002	**75c**
1-16	½	16	3	No. 3002	**75c**
2-08	⅝	8	3	No. 3006	**88c**
2-16	⅝	16	3	No. 3007	**88c**
3-08	¾	8	3	No. 3010	**$1.06**
3-16	¾	16	3	No. 3011	**$1.06**
4-08	1	8	3	No. 3014	**$1.19**
4-16	1	16	3	No. 3015	**$1.19**
5-08	1¼	8	4	No. 3018	**$1.32**
5-16	1¼	16	4	No. 3019	**$1.32**
8-10	2	10	4	No. 3907	**$1.91**

Special Antenna All-Band Tuner Inductance
(equivalent to B. & W. No. 3907 7 inch)
7" length, 2" diam., 10 turns/inch,
Price $3.30

References: A.R.R.L. Handbook, 1961;
"QST," March, 1959;
"Amateur Radio," Dec. 1959.

Write for range of Transmission Cables

WILLIAM WILLIS & CO.

PTY. LTD.
Manufacturers and Importers
77 CANTERBURY RD., CANTERBURY VIC, 3126 Phone 836-0707